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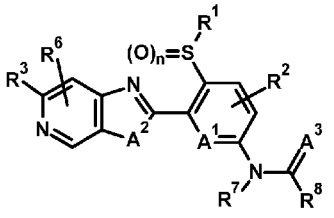
Erklärungen gemäß Regel 4.17:
— *hinsichtlich der Berechtigung des Anmelders, ein Patent zu beantragen und zu erhalten (Regel 4.17 Ziffer ii)*

Veröffentlicht:
— *mit internationalem Recherchenbericht (Artikel 21 Absatz 3)*

WO 2018/065292 A1

(54) **Title:** 2-(HET)ARYL-SUBSTITUTED CONDENSED BICYCLIC HETEROCYCLE DERIVATIVES AS PEST CONTROL AGENTS

(54) **Bezeichnung:** 2-(HET)ARYL-SUBSTITUIERTE KONDENSIERTE BICYCLISCHE HETEROCYCLEN-DERIVATE ALS SCHÄDLINGS-BEKÄMPFUNGSMITTEL



(I)

(57) **Abstract:** The invention relates to new compounds of formula (I), where R^1, R^2, R^3, R^4, R^5, R^6, R^7, R^8, A^1, A^2, A^3 and n have the meanings indicated in the description, the use thereof as acaricides and/or insecticides for controlling animal pests, and a method and intermediate products for the production thereof.

(57) **Zusammenfassung:** Die Erfindung betrifft neue Verbindungen der Formel (I), in welcher R^1, R^2, R^3, R^4, R^5, R^6, R^7, R^8, A^1, A^2, A^3 und n die oben genannten Bedeutungen haben, deren Anwendung als Akarizide und/oder Insektizide zur Bekämpfung tierischer Schädlinge und Verfahren und Zwischenprodukte zu ihrer Herstellung.

2-(Het)aryl-substituted condensed bicyclic heterocycle derivatives as pest control agents

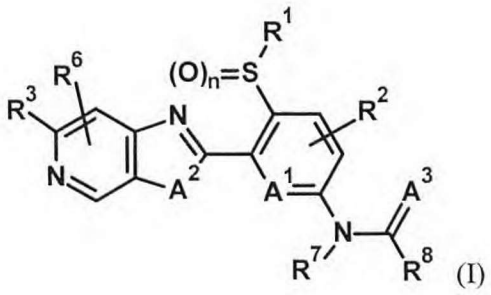
The present invention relates to novel 2-(het)aryl-substituted fused bicyclic heterocycle derivatives of the formula (I), to the use thereof as acaricides and/or insecticides for controlling animal pests, particularly arthropods and especially insects and arachnids, and to processes and intermediates for preparation thereof.

Fused heterocycle derivatives having insecticidal properties have already been described in the literature, for example in WO 2010/125985, WO 2012/074135, WO 2012/086848, WO 2013/018928, WO 2013/191113, WO 2014/142292, WO 2014/148451, WO 2015/000715, WO 2015/121136, WO 2015/133603, WO 2015/198859, WO 2015/002211, WO 2015/071180, WO 2015/091945, WO 2016/005263, WO 2015/198817, WO 2016/020286, WO 2016/023954, WO 2016/026848, WO2016/030229, WO 2016/039441, WO2016/039444, WO 2016/041819, WO 2016/046071, WO2016/058928, WO2016/059145, WO2016/071214, WO2016/096584, WO2016/107831, WO2016/116338, WO2016/121997, WO2016/124563, WO 2016/12457, WO2016/125621, WO2016/125622, WO 2017/025419.

However, some of the active compounds already known from the documents cited above have disadvantages in use, whether in that they have only a narrow spectrum of application or in that they do not have satisfactory insecticidal or acaricidal activity.

Novel 2-(het)aryl-substituted fused bicyclic heterocycle derivatives have now been found, and these have advantages over the compounds already known, examples of which are better biological or environmental properties, a wider range of application methods, better insecticidal or acaricidal activity, and also good compatibility with crop plants. The 2-(het)aryl-substituted fused bicyclic heterocycle derivatives can be used in combination with further agents for improving efficacy, especially against insects that are difficult to control.

The present invention therefore provides novel compounds of the formula (I)



(I)

in which (configuration 1)

A^1 represents nitrogen, $=N^+(O^-)$- or $=C(R^4)$-,

A^2 represents $-N(R^5)-$, oxygen or sulfur,

A^3 represents oxygen or sulfur,

R^1 represents (C_1-C_6)-alkyl, (C_1-C_6)-haloalkyl, (C_1-C_6)-cyanoalkyl, (C_1-C_6)-hydroxyalkyl, (C_1-C_6)-alkoxy-(C_1-C_6)-alkyl, (C_1-C_6)-haloalkoxy-(C_1-C_6)-alkyl, (C_2-C_6)-alkenyl, (C_2-C_6)-alkenyloxy-(C_1-C_6)-alkyl, (C_2-C_6)-haloalkenyloxy-(C_1-C_6)-alkyl, (C_2-C_6)-haloalkenyl, (C_2-C_6)-cyanoalkenyl, (C_2-C_6)-alkynyl, (C_2-C_6)-alkynyloxy-(C_1-C_6)-alkyl, (C_2-C_6)-haloalkynyloxy-(C_1-C_6)-alkyl, (C_2-C_6)-haloalkynyl, (C_2-C_6)-cyanoalkynyl, (C_3-C_8)-cycloalkyl, (C_3-C_8)-cycloalkyl-(C_3-C_8)-cycloalkyl, (C_1-C_6)-alkyl-(C_3-C_8)-cycloalkyl, halo-(C_3-C_8)-cycloalkyl, amino, (C_1-C_6)-alkylamino, di-(C_1-C_6)-alkyl-amino, (C_3-C_8)-cycloalkylamino, (C_1-C_6)-alkylcarbonylamino, (C_1-C_6)-alkylthio-(C_1-C_6)-alkyl, (C_1-C_6)-haloalkylthio-(C_1-C_6)-alkyl, (C_1-C_6)-alkylsulfinyl-(C_1-C_6)-alkyl, (C_1-C_6)-haloalkylsulfinyl-(C_1-C_6)-alkyl, (C_1-C_6)-alkylsulfonyl-(C_1-C_6)-alkyl, (C_1-C_6)-haloalkylsulfonyl-(C_1-C_6)-alkyl, (C_1-C_6)-alkoxy-(C_1-C_6)-alkylthio-(C_1-C_6)-alkyl, (C_1-C_6)-alkoxy-(C_1-C_6)-alkylsulfinyl-(C_1-C_6)-alkyl, (C_1-C_6)-alkoxy-(C_1-C_6)-alkylsulfonyl-(C_1-C_6)-alkyl, (C_1-C_6)-alkylcarbonyl-(C_1-C_6)-alkyl, (C_1-C_6)-haloalkylcarbonyl-(C_1-C_6)alkyl, (C_1-C_6)-alkoxycarbonyl-(C_1-C_6)-alkyl, (C_1-C_6)-haloalkoxycarbonyl-(C_1-C_6)-alkyl, (C_1-C_6)-alkylsulfonylamino, aminosulfonyl-(C_1-C_6)-alkyl, (C_1-C_6)-alkylaminosulfonyl-(C_1-C_6)-alkyl, di-(C_1-C_6)-alkylaminosulfonyl-(C_1-C_6)-alkyl,

or represents (C_1-C_6)-alkyl, (C_1-C_6)-alkoxy, (C_2-C_6)-alkenyl, (C_2-C_6)-alkynyl, (C_3-C_8)-cycloalkyl, each of which is optionally mono- or polysubstituted by identical or different substituents from the group consisting of aryl, hetaryl and heterocyclyl, where aryl, hetaryl or heterocyclyl may each optionally be mono- or polysubstituted by identical or different substituents from the group consisting of halogen, cyano, nitro, hydroxy, amino, carboxy, carbamoyl, aminosulfonyl, (C_1-C_6)-alkyl, (C_3-C_6)-cycloalkyl, (C_1-C_6)-alkoxy, (C_1-C_6)-haloalkyl, (C_1-C_6)-haloalkoxy, (C_1-C_6)-alkylthio, (C_1-C_6)-alkylsulfinyl, (C_1-C_6)-alkylsulfonyl, (C_1-C_6)-alkylsulfimino, (C_1-C_6)-alkylsulfimino-(C_1-C_6)-alkyl, (C_1-C_6)-alkylsulfimino-(C_2-C_6)-alkylcarbonyl, (C_1-C_6)-alkylsulfoximino, (C_1-C_6)-alkylsulfoximino-(C_1-C_6)-alkyl, (C_1-C_6)-alkylsulfoximino-(C_2-C_6)-alkylcarbonyl, (C_1-C_6)-alkoxycarbonyl, (C_1-C_6)-alkylcarbonyl, (C_3-C_6)-trialkylsilyl and benzyl, or

R^1 represents aryl, hetaryl or heterocyclyl, each of which is optionally mono- or polysubstituted by identical or different substituents from the group consisting of halogen, cyano, nitro, hydroxy, amino, carboxyl, carbamoyl, (C_1-C_6)-alkyl, (C_3-C_8)-cycloalkyl, (C_1-C_6)-alkoxy, (C_1-C_6)-haloalkyl, (C_1-C_6)-haloalkoxy, (C_1-C_6)-alkylthio, (C_1-C_6)-alkylsulfinyl, (C_1-C_6)-alkylsulfonyl, (C_1-C_6)-alkylsulfimino, (C_1-C_6)-alkylsulfimino-(C_1-C_6)-alkyl, (C_1-C_6)-alkylsulfimino-(C_2-C_6)-alkylcarbonyl, (C_1-C_6)-alkylsulfoximino, (C_1-C_6)-alkylsulfoximino-(C_1-C_6)-alkyl, (C_1-C_6)-alkylsulfoximino-(C_2-C_6)-alkylcarbonyl, (C_1-C_6)-alkoxycarbonyl, (C_1-C_6)-alkylcarbonyl, (C_3-C_6)-trialkylsilyl, (=O) (only in the case of heterocyclyl) and $(=O)_2$ (only in the case of heterocyclyl),

R^2, R^3, R^4 and R^6 independently of one another represent hydrogen, cyano, halogen, nitro, acetyl, hydroxy, amino, SCN, tri-(C_1-C_6)-alkylsilyl, (C_3-C_8)-cycloalkyl, (C_3-C_8)-cycloalkyl-(C_3-C_8)-cycloalkyl, (C_1-C_6)-alkyl-(C_3-C_8)-cycloalkyl, halo-(C_3-C_8)-cycloalkyl, (C_1-C_6)-alkyl, (C_1-C_6)-haloalkyl, (C_1-C_6)-cyanoalkyl, (C_1-C_6)-hydroxyalkyl, hydroxycarbonyl-(C_1-C_6)-alkoxy, (C_1-C_6)-alkoxycarbonyl-(C_1-C_6)-alkyl, (C_1-C_6)-alkoxy-(C_1-C_6)-alkyl, (C_2-C_6)-alkenyl, (C_2-C_6)-haloalkenyl, (C_2-C_6)-cyanoalkenyl, (C_2-C_6)-alkynyl, (C_2-C_6)-haloalkynyl, (C_2-C_6)-cyanoalkynyl, (C_1-C_6)-alkoxy, (C_1-C_6)-haloalkoxy, (C_1-C_6)-cyanoalkoxy, (C_1-C_6)-alkoxycarbonyl-(C_1-C_6)-alkoxy, (C_1-C_6)-alkoxy-(C_1-C_6)-alkoxy, (C_1-C_6)-alkylhydroxyimino, (C_1-C_6)-alkoxyimino, (C_1-C_6)-alkyl-(C_1-C_6)-alkoxyimino, (C_1-C_6)-haloalkyl-(C_1-C_6)-alkoxyimino, (C_1-C_6)-alkylthio, (C_1-C_6)-haloalkylthio, (C_1-C_6)-alkoxy-(C_1-C_6)-alkylthio, (C_1-C_6)-alkylthio-(C_1-C_6)-alkyl, (C_1-C_6)-alkylsulfinyl, (C_1-C_6)-haloalkylsulfinyl, (C_1-C_6)-alkoxy-(C_1-C_6)-alkylsulfinyl, (C_1-C_6)-alkylsulfinyl-(C_1-C_6)-alkyl, (C_1-C_6)-alkylsulfonyl, (C_1-C_6)-haloalkylsulfonyl, (C_1-C_6)-alkoxy-(C_1-C_6)-alkylsulfonyl, (C_1-C_6)-alkylsulfonyl-(C_1-C_6)-alkyl, (C_1-C_6)-alkylsulfonyloxy, (C_1-C_6)-alkylcarbonyl, (C_1-C_6)-alkylthiocarbonyl, (C_1-C_6)-haloalkylcarbonyl, (C_1-C_6)-alkylcarbonyloxy, (C_1-C_6)-alkoxycarbonyl, (C_1-C_6)-haloalkoxycarbonyl, aminocarbonyl, (C_1-C_6)-alkylaminocarbonyl, (C_1-C_6)-alkylaminothiocarbonyl, di-(C_1-C_6)-alkylaminocarbonyl, di-(C_1-C_6)-alkylaminothiocarbonyl, (C_2-C_6)-alkenylaminocarbonyl, di-(C_2-C_6)-alkenylaminocarbonyl, (C_3-C_8)-cycloalkylaminocarbonyl, (C_1-C_6)-alkylsulfonylamino, (C_1-C_6)-alkylamino, di-(C_1-C_6)-alkylamino, aminosulfonyl, (C_1-C_6)-alkylaminosulfonyl, di-(C_1-C_6)-alkylaminosulfonyl, (C_1-C_6)-alkylsulfoximino, aminothiocarbonyl, (C_1-C_6)-alkylaminothiocarbonyl, di-(C_1-C_6)-alkyl-aminothiocarbonyl, (C_3-C_8)-cycloalkylamino, NHCO-(C_1-C_6)-alkyl ((C_1-C_6)-alkylcarbonylamino), SF_5 or

represent aryl or hetaryl, each of which is optionally mono- or polysubstituted by identical or different substituents, where (in the case of hetaryl) at least one carbonyl group may optionally be present and/or where possible substituents are in each case as follows: cyano, carboxyl, halogen, nitro, acetyl, hydroxy, amino, SCN, tri-(C_1-C_6)-alkylsilyl, (C_1-C_6)-alkyl, (C_1-C_6)-haloalkyl, (C_1-C_6)-cyanoalkyl, (C_1-C_6)-hydroxyalkyl, hydroxycarbonyl-(C_1-C_6)-alkoxy, (C_1-C_6)-alkoxycarbonyl-(C_1-C_6)-alkyl, (C_1-C_6)-alkoxy-(C_1-C_6)-alkyl, (C_2-C_6)-alkenyl, (C_2-C_6)-haloalkenyl, (C_2-C_6)-cyanoalkenyl, (C_2-C_6)-alkynyl, (C_2-C_6)-haloalkynyl, (C_2-C_6)-cyanoalkynyl, (C_1-C_6)-alkoxy, (C_1-C_6)-haloalkoxy, (C_1-C_6)-cyanoalkoxy, (C_1-C_6)-alkoxycarbonyl-(C_1-C_6)-alkoxy, (C_1-C_6)-alkoxy-(C_1-C_6)-alkoxy, (C_1-C_6)-alkylhydroxyimino, (C_1-C_6)-alkoxyimino, (C_1-C_6)-alkyl-(C_1-C_6)-alkoxyimino, (C_1-C_6)-haloalkyl-(C_1-C_6)-alkoxyimino, (C_1-C_6)-alkylthio, (C_1-C_6)-haloalkylthio, (C_1-C_6)-alkoxy-(C_1-C_6)-alkylthio, (C_1-C_6)-alkylthio-(C_1-C_6)-alkyl, (C_1-C_6)-alkylsulfinyl, (C_1-C_6)-haloalkylsulfinyl, (C_1-C_6)-alkoxy-(C_1-C_6)-alkylsulfinyl, (C_1-C_6)-alkylsulfinyl-(C_1-C_6)-alkyl, (C_1-C_6)-alkylsulfonyl, (C_1-C_6)-haloalkylsulfonyl, (C_1-C_6)-alkoxy-(C_1-C_6)-alkylsulfonyl, (C_1-C_6)-alkylsulfonyl-(C_1-C_6)-alkyl, (C_1-C_6)-alkylsulfonyloxy, (C_1-C_6)-alkylcarbonyl, (C_1-C_6)-haloalkylcarbonyl, (C_1-C_6)-alkylcarbonyloxy, (C_1-C_6)-alkoxycarbonyl, (C_1-C_6)-haloalkoxycarbonyl, aminocarbonyl, (C_1-C_6)-alkylaminocarbonyl, di-(C_1-C_6)-alkyl-

aminocarbonyl, (C_2-C_6)-alkenylaminocarbonyl, di-(C_2-C_6)-alkenylaminocarbonyl, (C_3-C_8)-cycloalkylaminocarbonyl, (C_1-C_6)-alkylsulfonylamino, (C_1-C_6)-alkylamino, di-(C_1-C_6)-alkylamino, aminosulfonyl, (C_1-C_6)-alkylaminosulfonyl, di-(C_1-C_6)-alkylaminosulfonyl, (C_1-C_6)-alkylsulfoximino, aminothiocarbonyl, (C_1-C_6)-alkylaminothiocarbonyl, di-(C_1-C_6)-alkylaminothiocarbonyl, (C_3-C_8)-cycloalkylamino,

R^5 represents (C_1-C_6)-alkyl, (C_1-C_6)-haloalkyl, (C_1-C_6)-cyanoalkyl, (C_1-C_6)-hydroxyalkyl, (C_1-C_6)-alkoxy-(C_1-C_6)-alkyl, (C_1-C_6)-haloalkoxy-(C_1-C_6)-alkyl, (C_2-C_6)-alkenyl, (C_2-C_6)-alkenyloxy-(C_1-C_6)-alkyl, (C_2-C_6)-haloalkenyloxy-(C_1-C_6)-alkyl, (C_2-C_6)-haloalkenyl, (C_2-C_6)-cyanoalkenyl, (C_2-C_6)-alkynyl, (C_2-C_6)-alkynyloxy-(C_1-C_6)-alkyl, (C_2-C_6)-haloalkynyloxy-(C_1-C_6)-alkyl, (C_2-C_6)-haloalkynyl, (C_2-C_6)-cyanoalkynyl, (C_3-C_8)-cycloalkyl, (C_3-C_8)-cycloalkyl-(C_3-C_8)-cycloalkyl, (C_1-C_6)-alkyl-(C_3-C_8)-cycloalkyl, halo-(C_3-C_8)-cycloalkyl, (C_1-C_6)-alkylthio-(C_1-C_6)-alkyl, (C_1-C_6)-haloalkylthio-(C_1-C_6)-alkyl, (C_1-C_6)-alkylsulfinyl-(C_1-C_6)-alkyl, (C_1-C_6)-haloalkylsulfinyl-(C_1-C_6)-alkyl, (C_1-C_6)-alkylsulfonyl-(C_1-C_6)-alkyl, (C_1-C_6)-haloalkylsulfonyl-(C_1-C_6)-alkyl, (C_1-C_6)-alkoxy-(C_1-C_6)-alkylthio-(C_1-C_6)-alkyl, (C_1-C_6)-alkoxy-(C_1-C_6)-alkylsulfinyl-(C_1-C_6)-alkyl, (C_1-C_6)-alkoxy-(C_1-C_6)-alkylsulfonyl-(C_1-C_6)-alkyl, (C_1-C_6)-alkylcarbonyl-(C_1-C_6)-alkyl, (C_1-C_6)-haloalkylcarbonyl-(C_1-C_6)-alkyl, (C_1-C_6)-alkoxycarbonyl-(C_1-C_6)-alkyl, (C_1-C_6)-haloalkoxycarbonyl-(C_1-C_6)-alkyl, aminocarbonyl-(C_1-C_6)-alkyl, (C_1-C_6)-alkylamino-(C_1-C_6)-alkyl, di-(C_1-C_6)-alkylamino-(C_1-C_6)-alkyl or (C_3-C_8)-cycloalkylamino-(C_1-C_6)-alkyl,

R^7 represents hydrogen or represents (C_1-C_6)-alkyl, (C_1-C_6)-alkoxy-(C_1-C_6)-alkyl, (C_2-C_6)-alkenyl, (C_2-C_6)-alkynyl, (C_3-C_6)-cycloalkyl, (C_3-C_{12})-cycloalkyl-(C_1-C_6)-alkyl or (C_4-C_{12})-bicycloalkyl, each of which is optionally mono- or polysubstituted by identical or different substituents, where the substituents independently of one another may be selected from the group consisting of halogen, cyano, nitro, hydroxy, (C_1-C_6)-alkyl, (C_1-C_4)-haloalkyl, (C_3-C_6)-cycloalkyl, (C_1-C_4)-alkoxy, (C_1-C_4)-haloalkoxy, (C_1-C_4)-alkylthio, (C_1-C_4)-alkylsulfinyl, (C_1-C_4)-alkylsulfonyl, (C_2-C_6)-alkoxycarbonyl, (C_2-C_6)-alkylcarbonyl, amino, (C_1-C_4)-alkylamino, di-$(C_1-C_4$-alkyl)amino, (C_3-C_6)-cycloalkylamino, a phenyl ring or a 3- or 6-membered aromatic, partially saturated or saturated heterocycle, where the phenyl ring or heterocycle may in each case optionally be mono- or polysubstituted by identical or different substituents, and where the substituents independently of one another may be selected from the group consisting of (C_1-C_6)-alkyl, (C_2-C_6)-alkenyl, (C_2-C_6)-alkynyl, (C_3-C_6)-cycloalkyl, (C_1-C_6)-haloalkyl, (C_2-C_6)-haloalkenyl, (C_2-C_6)-haloalkynyl, (C_3-C_6)-halocycloalkyl, halogen, cyano, NO_2, OH, (C_1-C_4)-alkoxy, (C_1-C_4)-haloalkoxy, (C_1-C_4)-alkylthio, (C_1-C_4)-alkylsulfinyl, (C_1-C_4)-alkylsulfonyl, (C_1-C_4)-haloalkylthio, (C_1-C_4)-haloalkylsulfinyl, (C_1-C_4)-haloalkylsulfonyl, (C_1-C_4)-alkylamino, di-$(C_1-C_4$-alkyl)amino, (C_3-C_6)-cycloalkylamino, $(C_1-C_6$-alkyl)carbonyl, $(C_1-C_6$-alkoxy)carbonyl, aminocarbonyl, $(C_1-C_6$-alkyl)aminocarbonyl, di-$(C_1-C_4$-alkyl)aminocarbonyl,

R^8 represents amino or (C_1-C_6)-alkylamino, di-(C_1-C_4)-alkylamino, (C_2-C_6)-alkenylamino, (C_2-C_6)-alkynylamino, (C_3-C_{12})-cycloalkylamino, (C_3-C_{12})-cycloalkyl-(C_1-C_6)-alkylamino, (C_4-C_{12})-bicycloalkylamino or hydrazino, each of which is optionally mono- or polysubstituted by identical or different substituents, where the substituents independently of one another may be selected from the group consisting of halogen, cyano, amino, nitro, hydroxy, (C=O)OH, (C_1-C_6)-alkyl, (C_3-C_6)-cycloalkyl, (C_1-C_4)-alkoxy, (C_1-C_4)-haloalkoxy, (C_1-C_4)-alkylthio, (C_1-C_4)-haloalkylthio, (C_1-C_4)-alkylsulfinyl, (C_1-C_4)-haloalkylsulfinyl, (C_1-C_4)-alkylsulfonyl, (C_1-C_4)-haloalkylsulfonyl, (C_1-C_4)-alkylsulfimino, (C_1-C_4)-alkylsulfoximino, (C_2-C_6)-alkoxycarbonyl, (C_2-C_6)-alkylcarbonyl, (C_1-C_6)-alkylthiocarbonyl, (C_1-C_6)-haloalkylcarbonyl, (C_1-C_6)-haloalkylthiocarbonyl, (C_1-C_6)-alkylcarbonylamino, aminocarbonyl, (C_1-C_6)-alkylaminocarbonyl, di-(C_1-C_6)-alkylaminocarbonyl, aminothiocarbonyl, (C_1-C_6)-alkylaminothiocarbonyl, di-(C_1-C_6)-alkylaminothiocarbonyl, (C_3-C_6)-trialkylsilyl, (C_1-C_4)-alkylamino, di-(C_1-C_4)-alkylamino, (C_3-C_6)-cycloalkylamino, aminosulfonyl, (C_1-C_6)-alkylaminosulfonyl, di-(C_1-C_6)-alkylaminosulfonyl, sulfonylamino, (C_1-C_6)-alkylsulfonylamino, di-(C_1-C_6)-alkylsulfonylamino, a phenyl ring or a 3- to 6-membered aromatic, partially saturated or saturated heterocycle, where the phenyl ring or heterocycle may in each case optionally be mono- or polysubstituted by identical or different substituents, and where the substituents independently of one another may be selected from the group consisting of (C_1-C_6)-alkyl, (C_2-C_6)-alkenyl, (C_2-C_6)-alkynyl, (C_3-C_6)-cycloalkyl, (C_1-C_6)-haloalkyl, (C_2-C_6)-haloalkenyl, (C_2-C_6)-haloalkynyl, (C_3-C_6)-halocycloalkyl, halogen, CN, (C=O)OH, NO_2, OH, (C_1-C_4)-alkoxy, (C_1-C_4)-haloalkoxy, (C_1-C_4)-alkylthio, (C_1-C_4)-alkylsulfinyl, (C_1-C_4)-alkylsulfonyl, (C_1-C_4)-haloalkylthio, (C_1-C_4)-haloalkylsulfinyl, (C_1-C_4)-haloalkylsulfonyl, aminosulfonyl, (C_1-C_6)-alkylaminosulfonyl, di-(C_1-C_6)-alkylaminosulfonyl, (C_1-C_6)-alkylcarbonyl, (C_1-C_6)-alkoxycarbonyl, aminocarbonyl, (C_1-C_6)-alkylaminocarbonyl, di-(C_1-C_4)-alkylaminocarbonyl, tri-(C_1-C_2)-alkylsilyl,

(referred to as not cyclically attached radical R^8 of configuration 1)

or

R^8 represents a 3- to 6-membered aromatic, partially saturated or saturated heterocycle which is attached via a nitrogen atom and where the heteroatoms are selected from the group consisting of N, S, O, where in each case at least one carbonyl group may be present and/or the heterocycle may in each case optionally be mono- or polysubstituted by identical or different substituents, where the substituents independently of one another may be selected from the group consisting of (C_1-C_6)-alkyl, (C_2-C_6)-alkenyl, (C_2-C_6)-alkynyl, (C_3-C_6)-cycloalkyl, (C_1-C_6)-haloalkyl, (C_2-C_6)-haloalkenyl, (C_2-C_6)-haloalkynyl, (C_3-C_6)-halocycloalkyl, halogen, CN, (C=O)OH, NO_2, OH, (C_1-C_4)-alkoxy, (C_1-C_4)-haloalkoxy, (C_1-C_4)-alkylthio, (C_1-C_4)-alkylsulfinyl, (C_1-C_4)-alkylsulfonyl, (C_1-C_4)-haloalkylthio, (C_1-C_4)-haloalkylsulfinyl, (C_1-C_4)-haloalkylsulfonyl,

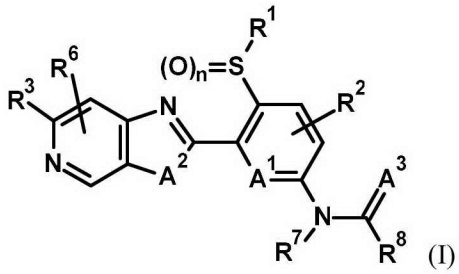
2017340690 07 Apr 2021

aminosulfonyl, (C_1-C_6)-alkylaminosulfonyl, di-(C_1-C_6)-alkylaminosulfonyl, amino, (C_1-C_4)-alkylamino, di-(C_1-C_4)-alkylamino, (C_3-C_6)-cycloalkylamino, (C_1-C_6)-alkylcarbonyl, (C_1-C_6)-alkoxycarbonyl, aminocarbonyl, (C_1-C_6)-alkylaminocarbonyl, di-(C_1-C_4)-alkylaminocarbonyl, tri-(C_1-C_2)-alkylsilyl, SF_5,

(referred to as cyclically attached radical R^8 of configuration 1)

n represents 0, 1 or 2.

According to a first aspect, the present invention provides a compound of the formula (I)



(I)

in which

A^1 represents nitrogen, $=N^+(O^-)$- or $=C(R^4)$-,

A^2 represents $-N(R^5)$-, oxygen or sulfur,

A^3 represents oxygen or sulfur,

R^1 represents (C_1-C_6)-alkyl, (C_1-C_6)-haloalkyl, (C_1-C_6)-cyanoalkyl, (C_1-C_6)-hydroxyalkyl, (C_1-C_6)-alkoxy-(C_1-C_6)-alkyl, (C_1-C_6)-haloalkoxy-(C_1-C_6)-alkyl, (C_2-C_6)-alkenyl, (C_2-C_6)-alkenyloxy-(C_1-C_6)-alkyl, (C_2-C_6)-haloalkenyloxy-(C_1-C_6)-alkyl, (C_2-C_6)-haloalkenyl, (C_2-C_6)-cyanoalkenyl, (C_2-C_6)-alkynyl, (C_2-C_6)-alkynyloxy-(C_1-C_6)-alkyl, (C_2-C_6)-haloalkynyloxy-(C_1-C_6)-alkyl, (C_2-C_6)-haloalkynyl, (C_2-C_6)-cyanoalkynyl, (C_3-C_8)-cycloalkyl, (C_3-C_8)-cycloalkyl-(C_3-C_8)-cycloalkyl, (C_1-C_6)-alkyl-(C_3-C_8)-cycloalkyl, halo-(C_3-C_8)-cycloalkyl, amino, (C_1-C_6)-alkylamino, di-(C_1-C_6)-alkylamino, (C_3-C_8)-cycloalkylamino, (C_1-C_6)-alkylcarbonylamino, (C_1-C_6)-alkylthio-(C_1-C_6)-alkyl, (C_1-C_6)-haloalkylthio-(C_1-C_6)-alkyl, (C_1-C_6)-alkylsulfinyl-(C_1-C_6)-alkyl, (C_1-C_6)-haloalkylsulfinyl-(C_1-C_6)-alkyl, (C_1-C_6)-alkylsulfonyl-(C_1-C_6)-alkyl, (C_1-C_6)-haloalkylsulfonyl-(C_1-C_6)-alkyl, (C_1-C_6)-alkoxy-(C_1-C_6)-alkylthio-(C_1-C_6)-alkyl, (C_1-C_6)-alkoxy-(C_1-C_6)-alkylsulfinyl-(C_1-C_6)-alkyl, (C_1-C_6)-alkoxy-(C_1-C_6)-alkylsulfonyl-(C_1-C_6)-alkyl, (C_1-C_6)-alkylcarbonyl-(C_1-C_6)-alkyl, (C_1-C_6)-haloalkylcarbonyl-(C_1-C_6)alkyl, (C_1-C_6)-alkoxycarbonyl-(C_1-C_6)-alkyl, (C_1-C_6)-haloalkoxycarbonyl-(C_1-C_6)-alkyl, (C_1-C_6)-alkylsulfonylamino, aminosulfonyl-(C_1-C_6)-alkyl, (C_1-C_6)-alkylaminosulfonyl-(C_1-C_6)-alkyl, di-(C_1-C_6)-alkylaminosulfonyl-(C_1-C_6)-alkyl,

2017340690 07 Apr 2021

or represents (C_1-C_6)-alkyl, (C_1-C_6)-alkoxy, (C_2-C_6)-alkenyl, (C_2-C_6)-alkynyl, (C_3-C_8)-cycloalkyl, each of which is optionally mono- or polysubstituted by identical or different substituents from the group consisting of aryl, hetaryl and heterocyclyl, where aryl, hetaryl or heterocyclyl may each optionally be mono- or polysubstituted by identical or different substituents from the group consisting of halogen, cyano, nitro, hydroxy, amino, carboxy, carbamoyl, aminosulfonyl, (C_1-C_6)-alkyl, (C_3-C_6)-cycloalkyl, (C_1-C_6)-alkoxy, (C_1-C_6)-haloalkyl, (C_1-C_6)-haloalkoxy, (C_1-C_6)-alkylthio, (C_1-C_6)-alkylsulfinyl, (C_1-C_6)-alkylsulfonyl, (C_1-C_6)-alkylsulfimino, (C_1-C_6)-alkylsulfimino-(C_1-C_6)-alkyl, (C_1-C_6)-alkylsulfimino-(C_2-C_6)-alkylcarbonyl, (C_1-C_6)-alkylsulfoximino, (C_1-C_6)-alkylsulfoximino-(C_1-C_6)-alkyl, (C_1-C_6)-alkylsulfoximino-(C_2-C_6)-alkylcarbonyl, (C_1-C_6)-alkoxycarbonyl, (C_1-C_6)-alkylcarbonyl, (C_3-C_6)-trialkylsilyl and benzyl, or

R^1 represents aryl, hetaryl or heterocyclyl, each of which is optionally mono- or polysubstituted by identical or different substituents from the group consisting of halogen, cyano, nitro, hydroxy, amino, carboxyl, carbamoyl, (C_1-C_6)-alkyl, (C_3-C_8)-cycloalkyl, (C_1-C_6)-alkoxy, (C_1-C_6)-haloalkyl, (C_1-C_6)-haloalkoxy, (C_1-C_6)-alkylthio, (C_1-C_6)-alkylsulfinyl, (C_1-C_6)-alkylsulfonyl, (C_1-C_6)-alkylsulfimino, (C_1-C_6)-alkylsulfimino-(C_1-C_6)-alkyl, (C_1-C_6)-alkylsulfimino-(C_2-C_6)-alkylcarbonyl, (C_1-C_6)-alkylsulfoximino, (C_1-C_6)-alkylsulfoximino-(C_1-C_6)-alkyl, (C_1-C_6)-alkylsulfoximino-(C_2-C_6)-alkylcarbonyl, (C_1-C_6)-alkoxycarbonyl, (C_1-C_6)-alkylcarbonyl, (C_3-C_6)-trialkylsilyl, (=O) (only in the case of heterocyclyl) and $(=O)_2$ (only in the case of heterocyclyl),

R^2, R^3, R^4 and R^6 independently of one another represent hydrogen, cyano, halogen, nitro, acetyl, hydroxy, amino, SCN, tri-(C_1-C_6)-alkylsilyl, (C_3-C_8)-cycloalkyl, (C_3-C_8)-cycloalkyl-(C_3-C_8)-cycloalkyl, (C_1-C_6)-alkyl-(C_3-C_8)-cycloalkyl, halo-(C_3-C_8)-cycloalkyl, (C_1-C_6)-alkyl, (C_1-C_6)-haloalkyl, (C_1-C_6)-cyanoalkyl, (C_1-C_6)-hydroxyalkyl, hydroxycarbonyl-(C_1-C_6)-alkoxy, (C_1-C_6)-alkoxycarbonyl-(C_1-C_6)-alkyl, (C_1-C_6)-alkoxy-(C_1-C_6)-alkyl, (C_2-C_6)-alkenyl, (C_2-C_6)-haloalkenyl, (C_2-C_6)-cyanoalkenyl, (C_2-C_6)-alkynyl, (C_2-C_6)-haloalkynyl, (C_2-C_6)-cyanoalkynyl, (C_1-C_6)-alkoxy, (C_1-C_6)-haloalkoxy, (C_1-C_6)-cyanoalkoxy, (C_1-C_6)-alkoxycarbonyl-(C_1-C_6)-alkoxy, (C_1-C_6)-alkoxy-(C_1-C_6)-alkoxy, (C_1-C_6)-alkylhydroxyimino, (C_1-C_6)-alkoxyimino, (C_1-C_6)-alkyl-(C_1-C_6)-alkoxyimino, (C_1-C_6)-haloalkyl-(C_1-C_6)-alkoxyimino, (C_1-C_6)-alkylthio, (C_1-C_6)-haloalkylthio, (C_1-C_6)-alkoxy-(C_1-C_6)-alkylthio, (C_1-C_6)-alkylthio-(C_1-C_6)-alkyl, (C_1-C_6)-alkylsulfinyl, (C_1-C_6)-haloalkylsulfinyl, (C_1-C_6)-alkoxy-(C_1-C_6)-alkylsulfinyl, (C_1-C_6)-alkylsulfinyl-(C_1-C_6)-alkyl, (C_1-C_6)-alkylsulfonyl, (C_1-C_6)-haloalkylsulfonyl, (C_1-C_6)-alkoxy-(C_1-C_6)-alkylsulfonyl, (C_1-C_6)-alkylsulfonyl-(C_1-C_6)-alkyl, (C_1-C_6)-alkylsulfonyloxy, (C_1-C_6)-alkylcarbonyl, (C_1-C_6)-alkylthiocarbonyl, (C_1-C_6)-haloalkylcarbonyl, (C_1-C_6)-alkylcarbonyloxy, (C_1-C_6)-alkoxycarbonyl, (C_1-C_6)-haloalkoxycarbonyl, aminocarbonyl, (C_1-C_6)-alkylaminocarbonyl, (C_1-C_6)-alkylaminothiocarbonyl, di-(C_1-C_6)-alkylaminocarbonyl, di-(C_1-C_6)-alkylaminothiocarbonyl, (C_2-C_6)-alkenylaminocarbonyl, di-(C_2-C_6)-alkenylaminocarbonyl, (C_3-C_8)-cycloalkylaminocarbonyl, (C_1-C_6)-alkylsulfonylamino, (C_1-C_6)-alkylamino, di-(C_1-C_6)-

2017340690 07 Apr 2021

alkylamino, aminosulfonyl, (C_1-C_6)-alkylaminosulfonyl, di-(C_1-C_6)-alkylaminosulfonyl, (C_1-C_6)-alkylsulfoximino, aminothiocarbonyl, (C_1-C_6)-alkylaminothiocarbonyl, di-(C_1-C_6)-alkyl-aminothiocarbonyl, (C_3-C_8)-cycloalkylamino, NHCO-(C_1-C_6)-alkyl ((C_1-C_6)-alkylcarbonylamino), SF_5 or

represent aryl or hetaryl, each of which is optionally mono- or polysubstituted by identical or different substituents, where (in the case of hetaryl) at least one carbonyl group may optionally be present and/or where possible substituents are in each case as follows: cyano, carboxyl, halogen, nitro, acetyl, hydroxy, amino, SCN, tri-(C_1-C_6)-alkylsilyl, (C_1-C_6)-alkyl, (C_1-C_6)-haloalkyl, (C_1-C_6)-cyanoalkyl, (C_1-C_6)-hydroxyalkyl, hydroxycarbonyl-(C_1-C_6)-alkoxy, (C_1-C_6)-alkoxycarbonyl-(C_1-C_6)-alkyl, (C_1-C_6)-alkoxy-(C_1-C_6)-alkyl, (C_2-C_6)-alkenyl, (C_2-C_6)-haloalkenyl, (C_2-C_6)-cyanoalkenyl, (C_2-C_6)-alkynyl, (C_2-C_6)-haloalkynyl, (C_2-C_6)-cyanoalkynyl, (C_1-C_6)-alkoxy, (C_1-C_6)-haloalkoxy, (C_1-C_6)-cyanoalkoxy, (C_1-C_6)-alkoxycarbonyl-(C_1-C_6)-alkoxy, (C_1-C_6)-alkoxy-(C_1-C_6)-alkoxy, (C_1-C_6)-alkylhydroxyimino, (C_1-C_6)-alkoxyimino, (C_1-C_6)-alkyl-(C_1-C_6)-alkoxyimino, (C_1-C_6)-haloalkyl-(C_1-C_6)-alkoxyimino, (C_1-C_6)-alkylthio, (C_1-C_6)-haloalkylthio, (C_1-C_6)-alkoxy-(C_1-C_6)-alkylthio, (C_1-C_6)-alkylthio-(C_1-C_6)-alkyl, (C_1-C_6)-alkylsulfinyl, (C_1-C_6)-haloalkylsulfinyl, (C_1-C_6)-alkoxy-(C_1-C_6)-alkylsulfinyl, (C_1-C_6)-alkylsulfinyl-(C_1-C_6)-alkyl, (C_1-C_6)-alkylsulfonyl, (C_1-C_6)-haloalkylsulfonyl, (C_1-C_6)-alkoxy-(C_1-C_6)-alkylsulfonyl, (C_1-C_6)-alkylsulfonyl-(C_1-C_6)-alkyl, (C_1-C_6)-alkylsulfonyloxy, (C_1-C_6)-alkylcarbonyl, (C_1-C_6)-haloalkylcarbonyl, (C_1-C_6)-alkylcarbonyloxy, (C_1-C_6)-alkoxycarbonyl, (C_1-C_6)-haloalkoxycarbonyl, aminocarbonyl, (C_1-C_6)-alkylaminocarbonyl, di-(C_1-C_6)-alkyl-aminocarbonyl, (C_2-C_6)-alkenylaminocarbonyl, di-(C_2-C_6)-alkenylaminocarbonyl, (C_3-C_8)-cycloalkylaminocarbonyl, (C_1-C_6)-alkylsulfonylamino, (C_1-C_6)-alkylamino, di-(C_1-C_6)-alkylamino, aminosulfonyl, (C_1-C_6)-alkylaminosulfonyl, di-(C_1-C_6)-alkylaminosulfonyl, (C_1-C_6)-alkylsulfoximino, aminothiocarbonyl, (C_1-C_6)-alkylaminothiocarbonyl, di-(C_1-C_6)-alkylaminothiocarbonyl, (C_3-C_8)-cycloalkylamino,

R^5 represents (C_1-C_6)-alkyl, (C_1-C_6)-haloalkyl, (C_1-C_6)-cyanoalkyl, (C_1-C_6)-hydroxyalkyl, (C_1-C_6)-alkoxy-(C_1-C_6)-alkyl, (C_1-C_6)-haloalkoxy-(C_1-C_6)-alkyl, (C_2-C_6)-alkenyl, (C_2-C_6)-alkenyloxy-(C_1-C_6)-alkyl, (C_2-C_6)-haloalkenyloxy-(C_1-C_6)-alkyl, (C_2-C_6)-haloalkenyl, (C_2-C_6)-cyanoalkenyl, (C_2-C_6)-alkynyl, (C_2-C_6)-alkynyloxy-(C_1-C_6)-alkyl, (C_2-C_6)-haloalkynyloxy-(C_1-C_6)-alkyl, (C_2-C_6)-haloalkynyl, (C_2-C_6)-cyanoalkynyl, (C_3-C_8)-cycloalkyl, (C_3-C_8)-cycloalkyl-(C_3-C_8)-cycloalkyl, (C_1-C_6)-alkyl-(C_3-C_8)-cycloalkyl, halo-(C_3-C_8)-cycloalkyl, (C_1-C_6)-alkylthio-(C_1-C_6)-alkyl, (C_1-C_6)-haloalkylthio-(C_1-C_6)-alkyl, (C_1-C_6)-alkylsulfinyl-(C_1-C_6)-alkyl, (C_1-C_6)-haloalkylsulfinyl-(C_1-C_6)-alkyl, (C_1-C_6)-alkylsulfonyl-(C_1-C_6)-alkyl, (C_1-C_6)-haloalkylsulfonyl-(C_1-C_6)-alkyl, (C_1-C_6)-alkoxy-(C_1-C_6)-alkylthio-(C_1-C_6)-alkyl, (C_1-C_6)-alkoxy-(C_1-C_6)-alkylsulfinyl-(C_1-C_6)-alkyl, (C_1-C_6)-alkoxy-(C_1-C_6)-alkylsulfonyl-(C_1-C_6)-alkyl, (C_1-C_6)-alkylcarbonyl-(C_1-C_6)-alkyl, (C_1-C_6)-haloalkylcarbonyl-(C_1-C_6)-alkyl, (C_1-C_6)-alkoxycarbonyl-(C_1-C_6)-alkyl, (C_1-C_6)-haloalkoxycarbonyl-(C_1-C_6)-alkyl, aminocarbonyl-(C_1-

2017340690 07 Apr 2021

C_6)-alkyl, (C_1-C_6)-alkylamino-(C_1-C_6)-alkyl, di-(C_1-C_6)-alkylamino-(C_1-C_6)-alkyl or (C_3-C_8)-cycloalkylamino-(C_1-C_6)-alkyl,

R^7 represents hydrogen or represents (C_1-C_6)-alkyl, (C_1-C_6)-alkoxy-(C_1-C_6)-alkyl, (C_2-C_6)-alkenyl, (C_2-C_6)-alkynyl, (C_3-C_6)-cycloalkyl, (C_3-C_{12})-cycloalkyl-(C_1-C_6)-alkyl or (C_4-C_{12})-bicycloalkyl, each of which is optionally mono- or polysubstituted by identical or different substituents, where the substituents independently of one another may be selected from the group consisting of halogen, cyano, nitro, hydroxy, (C_1-C_6)-alkyl, (C_1-C_4)-haloalkyl, (C_3-C_6)-cycloalkyl, (C_1-C_4)-alkoxy, (C_1-C_4)-haloalkoxy, (C_1-C_4)-alkylthio, (C_1-C_4)-alkylsulfinyl, (C_1-C_4)-alkylsulfonyl, (C_2-C_6)-alkoxycarbonyl, (C_2-C_6)-alkylcarbonyl, amino, (C_1-C_4)-alkylamino, di-(C_1-C_4-alkyl)amino, (C_3-C_6)-cycloalkylamino, a phenyl ring or a 3- or 6-membered aromatic, partially saturated or saturated heterocycle, where the phenyl ring or heterocycle may in each case optionally be mono- or polysubstituted by identical or different substituents, and where the substituents independently of one another may be selected from the group consisting of (C_1-C_6)-alkyl, (C_2-C_6)-alkenyl, (C_2-C_6)-alkynyl, (C_3-C_6)-cycloalkyl, (C_1-C_6)-haloalkyl, (C_2-C_6)-haloalkenyl, (C_2-C_6)-haloalkynyl, (C_3-C_6)-halocycloalkyl, halogen, cyano, NO_2, OH, (C_1-C_4)-alkoxy, (C_1-C_4)-haloalkoxy, (C_1-C_4)-alkylthio, (C_1-C_4)-alkylsulfinyl, (C_1-C_4)-alkylsulfonyl, (C_1-C_4)-haloalkylthio, (C_1-C_4)-haloalkylsulfinyl, (C_1-C_4)-haloalkylsulfonyl, (C_1-C_4)-alkylamino, di-(C_1-C_4-alkyl)amino, (C_3-C_6)-cycloalkylamino, (C_1-C_6-alkyl)carbonyl, (C_1-C_6-alkoxy)carbonyl, aminocarbonyl, (C_1-C_6-alkyl)aminocarbonyl, di-(C_1-C_4-alkyl)aminocarbonyl,

R^8 represents amino or (C_1-C_6)-alkylamino, di-(C_1-C_4)-alkylamino, (C_2-C_6)-alkenylamino, (C_2-C_6)-alkynylamino, (C_3-C_{12})-cycloalkylamino, (C_3-C_{12})-cycloalkyl-(C_1-C_6)-alkylamino, (C_4-C_{12})-bicycloalkylamino or hydrazino, each of which is optionally mono- or polysubstituted by identical or different substituents, where the substituents independently of one another may be selected from the group consisting of halogen, cyano, amino, nitro, hydroxy, (C=O)OH, (C_1-C_6)-alkyl, (C_3-C_6)-cycloalkyl, (C_1-C_4)-alkoxy, (C_1-C_4)-haloalkoxy, (C_1-C_4)-alkylthio, (C_1-C_4)-haloalkylthio, (C_1-C_4)-alkylsulfinyl, (C_1-C_4)-haloalkylsulfinyl, (C_1-C_4)-alkylsulfonyl, (C_1-C_4)-haloalkylsulfonyl, (C_1-C_4)-alkylsulfimino, (C_1-C_4)-alkylsulfoximino, (C_2-C_6)-alkoxycarbonyl, (C_2-C_6)-alkylcarbonyl, (C_1-C_6)-alkylthiocarbonyl, (C_1-C_6)-haloalkylcarbonyl, (C_1-C_6)-haloalkylthiocarbonyl, (C_1-C_6)-alkylcarbonylamino, aminocarbonyl, (C_1-C_6)-alkylaminocarbonyl, di-(C_1-C_6)-alkylaminocarbonyl, aminothiocarbonyl, (C_1-C_6)-alkylaminothiocarbonyl, di-(C_1-C_6)-alkylaminothiocarbonyl, (C_3-C_6)-trialkylsilyl, (C_1-C_4)-alkylamino, di-(C_1-C_4)-alkylamino, (C_3-C_6)-cycloalkylamino, aminosulfonyl, (C_1-C_6)-alkylaminosulfonyl, di-(C_1-C_6)-alkylaminosulfonyl, sulfonylamino, (C_1-C_6)-alkylsulfonylamino, di-(C_1-C_6)-alkylsulfonylamino, a phenyl ring or a 3- to 6-membered aromatic, partially saturated or saturated heterocycle, where the phenyl ring or heterocycle may in each case optionally be mono- or polysubstituted by identical or different substituents, and where the substituents independently of one another may be selected from the group consisting of (C_1-C_6)-alkyl, (C_2-

2017340690 07 Apr 2021

C_6)-alkenyl, (C_2-C_6)-alkynyl, (C_3-C_6)-cycloalkyl, (C_1-C_6)-haloalkyl, (C_2-C_6)-haloalkenyl, (C_2-C_6)-haloalkynyl, (C_3-C_6)-halocycloalkyl, halogen, CN, (C=O)OH, NO_2, OH, (C_1-C_4)-alkoxy, (C_1-C_4)-haloalkoxy, (C_1-C_4)-alkylthio, (C_1-C_4)-alkylsulfinyl, (C_1-C_4)-alkylsulfonyl, (C_1-C_4)-haloalkylthio, (C_1-C_4)-haloalkylsulfinyl, (C_1-C_4)-haloalkylsulfonyl, aminosulfonyl, (C_1-C_6)-alkylaminosulfonyl, di-(C_1-C_6)-alkylaminosulfonyl, (C_1-C_6)-alkylcarbonyl, (C_1-C_6)-alkoxycarbonyl, aminocarbonyl, (C_1-C_6)-alkylaminocarbonyl, di-(C_1-C_4)-alkylaminocarbonyl, tri-(C_1-C_2)-alkylsilyl,

or

R^8 represents a 3- to 6-membered aromatic, partially saturated or saturated heterocycle which is attached via a nitrogen atom and where the heteroatoms are selected from the group consisting of N, S, O, where in each case at least one carbonyl group may be present and/or the heterocycle may in each case optionally be mono- or polysubstituted by identical or different substituents, where the substituents independently of one another may be selected from the group consisting of (C_1-C_6)-alkyl, (C_2-C_6)-alkenyl, (C_2-C_6)-alkynyl, (C_3-C_6)-cycloalkyl, (C_1-C_6)-haloalkyl, (C_2-C_6)-haloalkenyl, (C_2-C_6)-haloalkynyl, (C_3-C_6)-halocycloalkyl, halogen, CN, (C=O)OH, NO_2, OH, (C_1-C_4)-alkoxy, (C_1-C_4)-haloalkoxy, (C_1-C_4)-alkylthio, (C_1-C_4)-alkylsulfinyl, (C_1-C_4)-alkylsulfonyl, (C_1-C_4)-haloalkylthio, (C_1-C_4)-haloalkylsulfinyl, (C_1-C_4)-haloalkylsulfonyl, aminosulfonyl, (C_1-C_6)-alkylaminosulfonyl, di-(C_1-C_6)-alkylaminosulfonyl, amino, (C_1-C_4)-alkylamino, di-(C_1-C_4)-alkylamino, (C_3-C_6)-cycloalkylamino, (C_1-C_6)-alkylcarbonyl, (C_1-C_6)-alkoxycarbonyl, aminocarbonyl, (C_1-C_6)-alkylaminocarbonyl, di-(C_1-C_4)-alkylaminocarbonyl, tri-(C_1-C_2).-alkylsilyl, SF_5, and

n represents 0, 1 or 2.

According to a second aspect, the present invention provides an agrochemical formulation comprising a compound of the formula (I) according to the first aspect and one or more extenders and/or surfactants.

It has additionally been found that the compounds of the formula (I) have very good efficacy as pesticides, preferably as insecticides and/or acaricides, and additionally generally have very good plant compatibility, in particular with respect to crop plants.

According to a third aspect, the present invention provides a method for controlling animal pests, wherein a compound of the formula (I) according to the first aspect or an agrochemical formulation according to the second aspect is allowed to act on the animal pests and/or their habitat.

According to a fourth aspect, the present invention provides use of a compound of the formula (I) according to the first aspect or of an agrochemical formulation according to the second aspect for controlling animal pests.

2017340690 07 Apr 2021

The compounds according to the invention are defined in general terms by the formula (I). Preferred substituents or ranges of the radicals given in the formulae mentioned above and below are illustrated hereinafter:

Configuration 2:

A^1 preferably represents nitrogen, $=N^+(O^-)$- or $=C(R^4)$-,

A^2 preferably represents –N-R^5, oxygen or sulfur,

A^3 preferably represents oxygen or sulfur,

R^1 preferably represents (C_1-C_4)-alkyl, (C_1-C_4)-hydroxyalkyl, (C_1-C_4)-haloalkyl, (C_1-C_4)-cyanoalkyl, (C_1-C_4)-alkoxy-(C_1-C_4)-alkyl, (C_1-C_4)-haloalkoxy-(C_1-C_4)-alkyl, (C_2-C_4)-alkenyl, (C_2-C_4)-alkenyloxy-(C_1-C_4)-alkyl, (C_2-C_4)-haloalkenyloxy-(C_1-C_4)-alkyl, (C_2-C_4)-haloalkenyl, (C_2-C_4)-cyanoalkenyl, (C_2-C_4)-alkynyl, (C_2-C_4)-alkynyloxy-(C_1-C_4)-alkyl, (C_2-C_4)-haloalkynyloxy-(C_1-C_4)-alkyl, (C_2-C_4)-haloalkynyl, (C_2-C_4)-cyanoalkynyl, (C_3-C_6)-cycloalkyl, (C_3-C_6)-cycloalkyl-(C_3-C_6)-cycloalkyl, (C_1-C_4)-alkyl-(C_3-C_6)-cycloalkyl, halo-(C_3-C_6)-cycloalkyl, (C_1-C_4)-alkylamino, di-(C_1-C_4)-alkylamino, (C_3-C_6)-cycloalkylamino, (C_1-C_4)-alkylcarbonylamino, (C_1-C_4)-alkylthio-(C_1-C_4)-alkyl, (C_1-C_4)-haloalkylthio-(C_1-C_4)-alkyl, (C_1-C_4)-alkylsulfinyl-(C_1-C_4)-alkyl, (C_1-C_4)-haloalkylsulfinyl-(C_1-C_4)-alkyl, (C_1-C_4)-alkylsulfonyl-(C_1-C_4)-alkyl, (C_1-C_4)-alkylcarbonyl-(C_1-C_4)-alkyl, (C_1-C_4)-haloalkylcarbonyl-(C_1-C_4)-alkyl, (C_1-C_4)-alkylsulfonylamino,

or represents (C_1-C_4)-alkyl, (C_1-C_4)-alkoxy, (C_2-C_4)-alkenyl, (C_2-C_4)-alkynyl, (C_3-C_6)-cycloalkyl, each of which is optionally mono- or disubstituted by identical or different substituents from the group consisting of aryl, hetaryl and heterocyclyl, where aryl, hetaryl and heterocyclyl may each optionally be mono- or disubstituted by identical or different substituents from the group consisting of halogen, cyano, carbamoyl, aminosulfonyl, (C_1-C_4)-alkyl, (C_3-C_4)-cycloalkyl,(C_1-

C_4)-alkoxy, (C_1-C_4)-haloalkyl, (C_1-C_4)-haloalkoxy, (C_1-C_4)-alkylthio, (C_1-C_4)-alkylsulfinyl, (C_1-C_4)-alkylsulfonyl, (C_1-C_4)-alkylsulfimino, or

R^1 preferably represents aryl, hetaryl or heterocyclyl, each of which is optionally mono- or disubstituted by identical or different substituents from the group consisting of halogen, cyano, carbamoyl, (C_1-C_4)-alkyl, (C_3-C_6)-cycloalkyl, (C_1-C_4)-alkoxy, (C_1-C_4)-haloalkyl, (C_1-C_4)-haloalkoxy, (C_1-C_4)-alkylthio, (C_1-C_4)-alkylsulfinyl, (C_1-C_4)-alkylsulfonyl, (C_1-C_4)-alkylsulfimino, (C_1-C_4)-alkylsulfoximino, (C_1-C_4)-alkylcarbonyl, (C_3-C_4)-trialkylsilyl, (=O) (only in the case of heterocyclyl) and $(=O)_2$ (only in the case of heterocyclyl),

R^2, R^3, R^4 and R^6 independently of one another preferably represent hydrogen, cyano, halogen, nitro, acetyl, hydroxy, amino, SCN, tri-(C_1-C_4)-alkylsilyl, (C_3-C_6)-cycloalkyl, (C_3-C_6)-cycloalkyl-(C_3-C_6)-cycloalkyl, (C_1-C_4)-alkyl-(C_3-C_6)-cycloalkyl, halo-(C_3-C_6)-cycloalkyl, (C_1-C_4)-alkyl, (C_1-C_4)-haloalkyl, (C_1-C_4)-cyanoalkyl, (C_1-C_4)-hydroxyalkyl, (C_1-C_4)-alkoxy-(C_1-C_4)-alkyl, (C_2-C_4)-alkenyl, (C_2-C_4)-haloalkenyl, (C_2-C_4)-cyanoalkenyl, (C_2-C_4)-alkynyl, (C_2-C_4)-haloalkynyl, (C_2-C_4)-cyanoalkynyl, (C_1-C_4)-alkoxy, (C_1-C_4)-haloalkoxy, (C_1-C_4)-cyanoalkoxy, (C_1-C_4)-alkoxy-(C_1-C_4)-alkoxy, (C_1-C_4)-alkylhydroxyimino, (C_1-C_4)-alkoxyimino, (C_1-C_4)-alkyl-(C_1-C_4)-alkoxyimino, (C_1-C_4)-haloalkyl-(C_1-C_4)-alkoxyimino, (C_1-C_4)-alkylthio, (C_1-C_4)-haloalkylthio, (C_1-C_4)-alkylthio-(C_1-C_4)-alkyl, (C_1-C_4)-alkylsulfinyl, (C_1-C_4)-haloalkylsulfinyl, (C_1-C_4)-alkylsulfinyl-(C_1-C_4)-alkyl, (C_1-C_4)-alkylsulfonyl, (C_1-C_4)-haloalkylsulfonyl, (C_1-C_4)-alkylsulfonyl-(C_1-C_4)-alkyl, (C_1-C_4)-alkylsulfonyloxy, (C_1-C_4)-alkylcarbonyl, (C_1-C_4)-haloalkylcarbonyl, aminocarbonyl, (C_1-C_4)-alkylaminocarbonyl, di-(C_1-C_4)-alkylaminocarbonyl, (C_1-C_4)-alkylsulfonylamino, (C_1-C_4)-alkylamino, di-(C_1-C_4)-alkylamino, aminosulfonyl, (C_1-C_4)-alkylaminosulfonyl, di-(C_1-C_4)-alkylaminosulfonyl, aminothiocarbonyl, NHCO-(C_1-C_4)-alkyl ((C_1-C_4)-alkylcarbonylamino), SF_5 or

represent phenyl or hetaryl, each of which is optionally mono- or disubstituted by identical or different substituents, where (in the case of hetaryl) at least one carbonyl group may optionally be present and/or where possible substituents are in each case as follows: cyano, halogen, nitro, acetyl, amino, (C_1-C_4)-alkyl, (C_1-C_4)-haloalkyl, (C_1-C_4)-cyanoalkyl, (C_1-C_4)-hydroxyalkyl, (C_1-C_4)-alkoxy-(C_1-C_4)-alkyl, (C_2-C_4)-alkenyl, (C_2-C_4)-haloalkenyl, (C_2-C_4)-cyanoalkenyl, (C_2-C_4)-alkynyl, (C_2-C_4)-haloalkynyl, (C_2-C_4)-cyanoalkynyl, (C_1-C_4)-alkoxy, (C_1-C_4)-haloalkoxy, (C_1-C_4)-cyanoalkoxy, (C_1-C_4)-alkoxy-(C_1-C_4)-alkoxy, (C_1-C_4)-alkylhydroxyimino, (C_1-C_4)-alkoxyimino, (C_1-C_4)-alkyl-(C_1-C_4)-alkoxyimino, (C_1-C_4)-haloalkyl-(C_1-C_4)-alkoxyimino, (C_1-C_4)-alkylthio, (C_1-C_4)-haloalkylthio, (C_1-C_4)-alkylthio-(C_1-C_4)-alkyl, (C_1-C_4)-alkylsulfinyl, (C_1-C_4)-haloalkylsulfinyl, (C_1-C_4)-alkylsulfinyl-(C_1-C_4)-alkyl, (C_1-C_4)-alkylsulfonyl, (C_1-C_4)-haloalkylsulfonyl, (C_1-C_4)-alkylsulfonyl-(C_1-C_4)-alkyl, (C_1-C_4)-alkylsulfonyloxy, (C_1-C_4)-alkylcarbonyl, (C_1-C_4)-haloalkylcarbonyl, aminocarbonyl, (C_1-C_4)-alkylaminocarbonyl, di-(C_1-C_4)-alkylaminocarbonyl, (C_1-C_4)-alkylsulfonylamino, (C_1-C_4)-alkylamino, di-(C_1-C_4)-

alkylamino, aminosulfonyl, (C_1-C_4)-alkylaminosulfonyl, di-(C_1-C_4)-alkylaminosulfonyl,

R^5 preferably represents (C_1-C_4)-alkyl, (C_1-C_4)-haloalkyl, (C_1-C_4)-cyanoalkyl, (C_1-C_4)-hydroxyalkyl, (C_1-C_4)-alkoxy-(C_1-C_4)-alkyl, (C_1-C_4)-haloalkoxy-(C_1-C_4)-alkyl, (C_2-C_4)-alkenyl, (C_2-C_4)-alkenyloxy-(C_1-C_4)-alkyl, (C_2-C_4)-haloalkenyloxy-(C_1-C_4)-alkyl, (C_2-C_4)-haloalkenyl, (C_2-C_4)-cyanoalkenyl, (C_2-C_4)-alkynyl, (C_2-C_4)-alkynyloxy-(C_1-C_4)-alkyl, (C_2-C_4)-haloalkynyl, (C_3-C_6)-cycloalkyl, (C_3-C_6)-cycloalkyl-(C_3-C_6)cycloalkyl, (C_1-C_4)-alkyl-(C_3-C_6)cycloalkyl, halo-(C_3-C_6)-cycloalkyl, (C_1-C_4)-alkylthio-(C_1-C_4)-alkyl, (C_1-C_4)-haloalkylthio-(C_1-C_4)-alkyl, (C_1-C_4)-alkylsulfinyl-(C_1-C_4)-alkyl, (C_1-C_4)-haloalkylsulfinyl-(C_1-C_4)-alkyl, (C_1-C_4)-alkylsulfonyl-(C_1-C_4)-alkyl, (C_1-C_4)-haloalkylsulfonyl-(C_1-C_4)-alkyl, (C_1-C_4)-alkoxy-(C_1-C_4)-alkylthio-(C_1-C_4)-alkyl or (C_1-C_4)-alkylcarbonyl-(C_1-C_4)-alkyl,

R^7 preferably represents hydrogen or represents (C_1-C_6)-alkyl, (C_1-C_6)-alkoxy-(C_1-C_6)-alkyl, (C_2-C_6)-alkenyl, (C_2-C_6)-alkynyl, (C_3-C_6)-cycloalkyl, (C_3-C_{12})-cycloalkyl-(C_1-C_6)-alkyl or (C_4-C_{12})-bicycloalkyl, each of which is optionally mono- or polysubstituted by identical or different substituents, where the substituents independently of one another may be selected from the group consisting of halogen, cyano, (C_1-C_6)-alkyl, (C_1-C_4)-haloalkyl, (C_3-C_6)-cycloalkyl, (C_1-C_4)-alkoxy, (C_1-C_4)-haloalkoxy, (C_1-C_4)-alkylthio, (C_1-C_4)-alkylsulfinyl, (C_1-C_4)-alkylsulfonyl, (C_2-C_6)-alkoxycarbonyl, (C_2-C_6)-alkylcarbonyl, a phenyl ring or a 3- or 6-membered aromatic, partially saturated or saturated heterocycle, where the phenyl ring or heterocycle may in each case optionally be mono- or polysubstituted by identical or different substituents, and where the substituents independently of one another may be selected from the group consisting of (C_1-C_6)-alkyl, (C_2-C_6)-alkenyl, (C_2-C_6)-alkynyl, (C_3-C_6)-cycloalkyl, (C_1-C_6)-haloalkyl, (C_2-C_6)-haloalkenyl, (C_2-C_6)-haloalkynyl, (C_3-C_6)-halocycloalkyl, halogen, cyano, (C_1-C_4)-alkoxy, (C_1-C_4)-haloalkoxy, (C_1-C_4)-alkylthio, (C_1-C_4)-alkylsulfinyl, (C_1-C_4)-alkylsulfonyl, (C_1-C_4)-haloalkylthio, (C_1-C_4)-haloalkylsulfinyl, (C_1-C_4)-haloalkylsulfonyl, (C_1-C_6-alkyl)carbonyl, (C_1-C_6-alkoxy)carbonyl, aminocarbonyl, (C_1-C_6-alkyl)aminocarbonyl, di-(C_1-C_4-alkyl)aminocarbonyl,

R^8 preferably represents amino or (C_1-C_6)-alkylamino, di-(C_1-C_4)-alkylamino, (C_2-C_6)-alkenylamino, (C_2-C_6)-alkynylamino, (C_3-C_{12})-cycloalkylamino, (C_3-C_{12})-cycloalkyl-(C_1-C_6)-alkylamino, (C_4-C_{12})-bicycloalkylamino or hydrazino, each of which is optionally mono- or polysubstituted by identical or different substituents, where the substituents independently of one another may be selected from the group consisting of halogen, cyano, amino, nitro, hydroxy, (C=O)OH, (C_1-C_6)-alkyl, (C_3-C_6)-cycloalkyl, (C_1-C_4)-alkoxy, (C_1-C_4)-haloalkoxy, (C_1-C_4)-alkylthio, (C_1-C_4)-haloalkylthio, (C_1-C_4)-alkylsulfinyl, (C_1-C_4)-haloalkylsulfinyl, (C_1-C_4)-alkylsulfonyl, (C_1-C_4)-haloalkylsulfonyl, (C_2-C_6)-alkoxycarbonyl, (C_2-C_6)-alkylcarbonyl, (C_1-C_6)-haloalkylcarbonyl, (C_1-C_6)-alkylcarbonylamino, aminocarbonyl, (C_1-C_6)-alkylaminocarbonyl, di-(C_1-C_6)-alkylaminocarbonyl, (C_1-C_4)-alkylamino, di-(C_1-C_4)-alkylamino,

(C_3-C_6)-cycloalkylamino, aminosulfonyl, (C_1-C_6)-alkylaminosulfonyl, di-(C_1-C_6)-alkylaminosulfonyl, sulfonylamino, (C_1-C_6)-alkylsulfonylamino, di-(C_1-C_6)-alkylsulfonylamino, a phenyl ring or a 3- to 6-membered aromatic, partially saturated or saturated heterocycle, where the phenyl ring or heterocycle may in each case optionally be mono- or polysubstituted by identical or different substituents, and where the substituents independently of one another may be selected from the group consisting of (C_1-C_6)-alkyl, (C_2-C_6)-alkenyl, (C_2-C_6)-alkynyl, (C_3-C_6)-cycloalkyl, (C_1-C_6)-haloalkyl, (C_2-C_6)-haloalkenyl, (C_2-C_6)-haloalkynyl, (C_3-C_6)-halocycloalkyl, halogen, cyano, (C=O)OH, NO_2, OH, (C_1-C_4)-alkoxy, (C_1-C_4)-haloalkoxy, (C_1-C_4)-alkylthio, (C_1-C_4)-alkylsulfinyl, (C_1-C_4)-alkylsulfonyl, (C_1-C_4)-haloalkylthio, (C_1-C_4)-haloalkylsulfinyl, (C_1-C_4)-haloalkylsulfonyl, aminosulfonyl, (C_1-C_6)-alkylaminosulfonyl, di-(C_1-C_6)-alkylaminosulfonyl, (C_1-C_6)-alkylcarbonyl, (C_1-C_6)-alkoxycarbonyl, aminocarbonyl, (C_1-C_6)-alkylaminocarbonyl, di-(C_1-C_4)-alkylaminocarbonyl,

(referred to as not cyclically attached radical R^8 of configuration 2)

or

R^8 furthermore preferably represents a 3- to 6-membered aromatic, partially saturated or saturated heterocycle which is attached via a nitrogen atom and where the heteroatoms are selected from the group consisting of N, S, O, where in each case at least one carbonyl group may optionally be present and/or the heterocycle may in each case optionally be mono- or polysubstituted by identical or different substituents, where the substituents independently of one another may be selected from the group consisting of (C_1-C_6)-alkyl, (C_2-C_6)-alkenyl, (C_2-C_6)-alkynyl, (C_3-C_6)-cycloalkyl, (C_1-C_6)-haloalkyl, (C_2-C_6)-haloalkenyl, (C_2-C_6)-haloalkynyl, (C_3-C_6)-halocycloalkyl, halogen, cyano, (C=O)OH, NO_2, OH, (C_1-C_4)-alkoxy, (C_1-C_4)-haloalkoxy, (C_1-C_4)-alkylthio, (C_1-C_4)-alkylsulfinyl, (C_1-C_4)-alkylsulfonyl, (C_1-C_4)-haloalkylthio, (C_1-C_4)-haloalkylsulfinyl, (C_1-C_4)-haloalkylsulfonyl, aminosulfonyl, (C_1-C_6)-alkylaminosulfonyl, di-(C_1-C_6)-alkylaminosulfonyl, amino, (C_1-C_4)-alkylamino, di-(C_1-C_4)-alkylamino, (C_3-C_6)-cycloalkylamino, (C_1-C_6)-alkylcarbonyl, (C_1-C_6)-alkoxycarbonyl, aminocarbonyl, (C_1-C_6)-alkylaminocarbonyl or di-(C_1-C_4)-alkylaminocarbonyl,

(referred to as cyclically attached radical R^8 of configuration 2)

n preferably represents 0, 1 or 2.

Configuration 3:

A^1 particularly preferably represents nitrogen or $=C(R^4)$-,

A^2 particularly preferably represents $-N(R^5)$- or oxygen,

A^3 particularly preferably represents oxygen or sulfur,

R^1 particularly preferably represents (C_1-C_4)-alkyl, (C_1-C_4)hydroxyalkyl, (C_1-C_4)haloalkyl, (C_2-C_4)-alkenyl, (C_2-C_4)haloalkenyl, (C_2-C_4)-alkynyl, (C_2-C_4)haloalkynyl, (C_3-C_6)cycloalkyl, (C_1-C_4)-alkylthio-(C_1-C_4)-alkyl, (C_1-C_4)-alkylsulfinyl-(C_1-C_4)-alkyl or (C_1-C_4)-alkylsulfonyl-(C_1-C_4)-alkyl,

R^2 particularly preferably represents hydrogen, cyano, halogen, (C_1-C_4)-alkyl, (C_1-C_4)-haloalkyl, (C_1-C_4)-haloalkoxy, (C_1-C_4)-alkylthio, (C_1-C_4)-alkylsulfinyl, (C_1-C_4)-alkylsulfonyl, (C_1-C_4)-haloalkylthio, (C_1-C_4)-haloalkylsulfinyl or (C_1-C_4)-haloalkylsulfonyl,

R^3 particularly preferably represents hydrogen, halogen, (C_1-C_4)-alkyl, (C_1-C_4)-haloalkyl, (C_1-C_4)-haloalkoxy, (C_1-C_4)-alkylthio, (C_1-C_4)-alkylsulfinyl, (C_1-C_4)-alkylsulfonyl, (C_1-C_4)-haloalkylthio, (C_1-C_4)-haloalkylsulfinyl or (C_1-C_4)-haloalkylsulfonyl,

R^4 particularly preferably represents hydrogen, halogen, cyano or (C_1-C_4)-alkyl,

R^5 particularly preferably represents (C_1-C_4)-alkyl or (C_1-C_4)-alkoxy-(C_1-C_4)-alkyl,

R^6 particularly preferably represents hydrogen, cyano, halogen, (C_1-C_4)-alkyl, (C_2-C_4)-alkenyl, (C_2-C_4)-alkynyl, (C_1-C_4)-haloalkyl, (C_3-C_6)-cycloalkyl, (C_1-C_4)-alkyl-(C_3-C_6)-cycloalkyl, (C_1-C_4)-alkoxy, (C_1-C_4)-haloalkoxy, (C_1-C_4)-alkylthio, (C_1-C_4)-haloalkylthio, (C_1-C_4)-alkylsulfinyl, (C_1-C_4)-haloalkylsulfinyl, (C_1-C_4)-alkylsulfonyl, (C_1-C_4)-haloalkylsulfonyl or (C_1-C_4)-alkylcarbonyl,

R^7 particularly preferably represents hydrogen or represents (C_1-C_4)-alkyl or (C_1-C_4)-alkoxy-(C_1-C_4)-alkyl, each of which is optionally mono- or polysubstituted by identical or different substituents from the group consisting of halogen, (C_1-C_2)-haloalkyl, cyano, phenyl and pyridyl, where phenyl and pyridyl may each optionally be mono- or disubstituted by identical or different substituents from the group consisting of (C_1-C_4)-alkyl, halogen and cyano,

R^8 particularly preferably represents amino or (C_1-C_4)-alkylamino, di-(C_1-C_4)-alkylamino, (C_2-C_6)-alkenylamino, (C_2-C_4)-alkynylamino, (C_3-C_6)-cycloalkylamino or hydrazino, each of which is optionally mono- or polysubstituted by identical or different substituents, where the substituents independently of one another may be selected from the group consisting of halogen, cyano, (C_1-C_4)-alkyl, (C_3-C_6)-cycloalkyl, (C_1-C_4)-alkoxy, (C_1-C_4)-haloalkoxy, (C_1-C_4)-alkylthio, (C_1-C_4)-haloalkylthio, (C_1-C_4)-alkylsulfinyl, (C_1-C_4)-haloalkylsulfinyl, (C_1-C_4)-alkylsulfonyl, (C_1-C_4)-haloalkylsulfonyl, (C_1-C_4)-alkoxycarbonyl, (C_1-C_4)-alkylcarbonyl, (C_1-C_6)-haloalkylcarbonyl, (C_1-C_4)-alkylcarbonylamino, aminocarbonyl, (C_1-C_6)-alkylaminocarbonyl, di-(C_1-C_6)-alkylaminocarbonyl, a phenyl ring or a 3- to 6-membered aromatic, partially saturated or saturated heterocycle, where the phenyl ring or heterocycle may in each case optionally be mono- or polysubstituted by identical or different substituents, and where the substituents independently of one another may be selected from the group consisting of (C_1-C_4)-alkyl, (C_3-C_6)-cycloalkyl, (C_1-C_4)-haloalkyl, halogen, cyano, (C_1-C_4)-alkoxy, (C_1-C_4)-haloalkoxy, (C_1-C_4)-alkylthio, (C_1-C_4)-

alkylsulfinyl, (C_1-C_4)-alkylsulfonyl, (C_1-C_4)-haloalkylthio, (C_1-C_4)-haloalkylsulfinyl, (C_1-C_4)-haloalkylsulfonyl,

(referred to as not cyclically attached radical R^8 of configuration 3)

or

R^8 furthermore particularly preferably represents a 3- to 6-membered aromatic, partially saturated or saturated heterocycle which is attached via a nitrogen atom and where the heteroatoms are selected from the group consisting of N, S, O, where in each case at least one carbonyl group may be present and/or the heterocycle may in each case optionally be mono- or polysubstituted by identical or different substituents, where the substituents independently of one another may be selected from the group consisting of (C_1-C_4)-alkyl, (C_3-C_6)-cycloalkyl, (C_1-C_6)-haloalkyl, halogen, cyano, (C_1-C_4)-alkoxy, (C_1-C_4)-haloalkoxy, (C_1-C_4)-alkylthio, (C_1-C_4)-alkylsulfinyl, (C_1-C_4)-alkylsulfonyl, (C_1-C_4)-haloalkylthio, (C_1-C_4)-haloalkylsulfinyl, (C_1-C_4)-haloalkylsulfonyl,

(referred to as cyclically attached radical R^8 of configuration 3)

n is even more preferably 0, 1 or 2.

Configuration 4:

A^1 very particularly preferably represents nitrogen or $=C(R^4)$-,

A^2 very particularly preferably represents $-N(R^5)$- or oxygen,

A^3 very particularly preferably represents oxygen or sulfur,

R^1 very particularly preferably represents methyl, ethyl, n-propyl, isopropyl, cyclopropyl, n-butyl, isobutyl, tert-butyl, cyclobutyl, fluoromethyl, difluoromethyl, trifluoromethyl, fluoroethyl, difluoroethyl, trifluoroethyl, tetrafluoroethyl or pentafluoroethyl,

R^2 very particularly preferably represents hydrogen, methyl, ethyl, fluorine, chlorine, bromine, cyano, fluoromethyl, difluoromethyl, trifluoromethyl, fluoroethyl, difluoroethyl, trifluoroethyl, tetrafluoroethyl, pentafluoroethyl, trifluoromethoxy, difluorochloromethoxy, dichlorofluoromethoxy, trifluoromethylthio, trifluoromethylsulfinyl or trifluoromethylsulfonyl,

R^3 very particularly preferably represents fluorine, chlorine, fluoromethyl, difluoromethyl, trifluoromethyl, fluoroethyl, difluoroethyl, trifluoroethyl, tetrafluoroethyl, pentafluoroethyl, trifluoromethoxy, difluorochloromethoxy, dichlorofluoromethoxy, trifluoromethylthio, trifluoromethylsulfinyl or trifluoromethylsulfonyl,

R^4 very particularly preferably represents hydrogen, fluorine, chlorine, bromine or cyano,

R^5 very particularly preferably represents methyl, ethyl, isopropyl, methoxymethyl or methoxyethyl,

R^6 very particularly preferably represents hydrogen,

R^7 very particularly preferably represents hydrogen, methyl, ethyl, isopropyl, tert-butyl, methoxymethyl or methoxyethyl,

R^8 very particularly preferably represents amino or represents methylamino, dimethylamino, ethylamino, isopropylamino, diethylamino, methylethylamino, propylamino, methylpropylamino, ethylpropylamino, methoxyethylamino, cyanoethylamino, methylthioethylamino, methylsulfinylethylamino, methylsulfonylethylamino, cyclopropylamino, cyclobutylamino, methylcyclopropylamino, methylcyclobutylamino, methylhydrazino, dimethylhydrazino, trimethylhydrazino or phenylhydrazino,

(referred to as not cyclically attached radical R^8 of configuration 4)

or

R^8 furthermore very particularly preferably represents aziridinyl, azetidinyl, pyrrolidinyl, pyrazolidinyl, imidazolidinyl, thiazolidinyl, oxazolidinyl, piperidinyl, piperazinyl, morpholinyl, thiomorpholinyl, pyrrolidonyl, imidazolidonyl, triazolinonyl, tetrazolinonyl, piperidonyl, pyrrolyl, pyrazolyl, triazolyl, imidazolyl or oxazolyl, attached via a nitrogen atom, in each case optionally mono- or disubstituted by identical or different substituents from the group consisting of methyl, ethyl, trifluoromethyl, fluorine, chlorine, bromine and cyano,

(referred to as cyclically attached radical R^8 of configuration 4)

n very particularly preferably represents 0, 1 or 2.

Configuration 5-1:

A^1 most preferably represents nitrogen,

A^2 most preferably represents $-N(R^5)-$,

A^3 most preferably represents oxygen or sulfur,

R^1 most preferably represents ethyl,

R^2 most preferably represents hydrogen, methyl or trifluoromethyl,

R^3 most preferably represents trifluoromethyl, pentafluoroethyl, trifluoromethylthio, trifluoromethylsulfinyl or trifluoromethylsulfonyl,

R^5 most preferably represents methyl,

R^6 most preferably represents hydrogen,

R^7 most preferably represents hydrogen or methyl,

R^8 most preferably represents amino, methylamino, dimethylamino, ethylamino, isopropylamino, cyclopropylamino, methoxyethylamino, cyanoethylamino, methylthioethylamino, methylsulfinylethylamino or methylsulfonylethylamino,

(referred to as not cyclically attached radical R^8 of configuration 5-1)

n most preferably represents 0, 1 or 2.

Configuration 5-2:

A^1 most preferably represents nitrogen,

A^2 most preferably represents $-N(R^5)-$,

A^3 most preferably represents oxygen,

R^1 most preferably represents ethyl,

R^2 most preferably represents hydrogen, methyl or trifluoromethyl,

R^3 most preferably represents trifluoromethyl, pentafluoroethyl, trifluoromethylthio, trifluoromethylsulfinyl or trifluoromethylsulfonyl,

R^5 most preferably represents methyl,

R^6 most preferably represents hydrogen,

R^7 most preferably represents hydrogen or methyl,

R^8 most preferably represents amino, methylamino, dimethylamino, ethylamino, isopropylamino, cyclopropylamino, methoxyethylamino, cyanoethylamino, methylthioethylamino, methylsulfinylethylamino or methylsulfonylethylamino,

(referred to as not cyclically attached radical R^8 of configuration 5-2)

R^8 furthermore most preferably represents pyrrolidinyl, attached via a nitrogen atom, or represents pyrazolyl, attached via a nitrogen atom and optionally monosubstituted by bromine,

(referred to as cyclically attached radical R^8 of configuration 5-2)

n most preferably represents 0, 1 or 2.

Configuration 6-1:

A^1 especially represents nitrogen,

A^2 especially represents –N-(R^5)-,

A^3 especially represents oxygen,

R^1 especially represents ethyl,

R^2 especially represents hydrogen,

R^3 especially represents trifluoromethyl,

R^5 especially represents methyl,

R^6 especially represents hydrogen,

R^7 especially represents hydrogen,

R^8 especially represents methylamino (-$NHCH_3$), ethylamino (-$NHCH_2CH_3$), isopropylamino (-$NHiC_3H_7$), methoxyethylamino (-$NHCH_2CH_2OCH_3$), cyanoethylamino (-$NHCH_2CH_2CN$), methylthioethylamino (-$NHCH_2CH_2SCH_3$), methylsulfinylethylamino (-$NHCH_2CH_2SOCH_3$) or methylsulfonylethylamino (-$NHCH_2CH_2SO_2CH_3$),

(referred to as not cyclically attached radical R^8 of configuration 6-1),

n especially represents 2.

Configuration 6-2:

A^1 especially represents nitrogen,

A^2 especially represents –N-(R^5)-,

A^3 especially represents oxygen,

R^1 especially represents ethyl,

R^2 especially represents hydrogen or methyl,

R^3 especially represents trifluoromethyl,

R^5 especially represents methyl,

R^6 especially represents hydrogen,

R^7 especially represents hydrogen or methyl,

R^8 especially represents methylamino (-$NHCH_3$), ethylamino (-$NHCH_2CH_3$), isopropylamino (-$NHiC_3H_7$), methoxyethylamino (-$NHCH_2CH_2OCH_3$), cyanoethylamino (-$NHCH_2CH_2CN$), methylthioethylamino (-$NHCH_2CH_2SCH_3$), methylsulfinylethylamino (-$NHCH_2CH_2SOCH_3$), methylsulfonylethylamino (-$NHCH_2CH_2SO_2CH_3$) or dimethylamino (-$N(CH_3)_2$),

(referred to as not cyclically attached radical R^8 of configuration 6-2),

or

R^8 furthermore especially represents pyrrolidinyl, attached via a nitrogen atom, or represents pyrazolyl, attached via a nitrogen atom and optionally monosubstituted by bromine,

(referred to as cyclically attached radical R^8 of configuration 6-2)

n especially represents 2.

Configuration 6-3:

A^1 especially represents nitrogen,

A^2 especially represents –N-(R^5)-,

A^3 especially represents oxygen,

R^1 especially represents ethyl,

R^2 especially represents hydrogen or methyl,

R^3 especially represents trifluoromethyl,

R^5 especially represents methyl,

R^6 especially represents hydrogen,

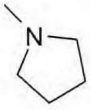
R^7 especially represents hydrogen or methyl,

R^8 especially represents methylamino ($-NHCH_3$), ethylamino ($-NHCH_2CH_3$), isopropylamino ($-NHiC_3H_7$), methoxyethylamino ($-NHCH_2CH_2OCH_3$), cyanoethylamino ($-NHCH_2CH_2CN$), methylthioethylamino ($-NHCH_2CH_2SCH_3$), methylsulfinylethylamino ($-NHCH_2CH_2SOCH_3$), methylsulfonylethylamino ($-NHCH_2CH_2SO_2CH_3$) or dimethylamino ($-N(CH_3)_2$),

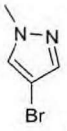
(referred to as not cyclically attached radical R^8 of configuration 6-3),

or

R^8 furthermore especially represents pyrrolidinyl, attached via a nitrogen atom, of the formula below:



or represents pyrazolyl, attached via a nitrogen atom and monosubstituted by bromine, of the formula:



,

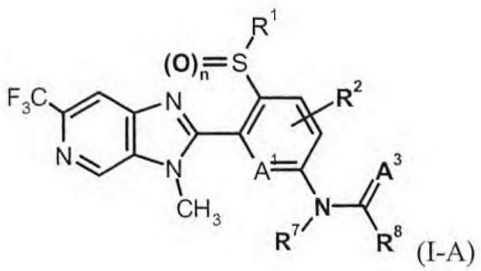
(referred to as cyclically attached radical R^8 of configuration 6-3).

n especially represents 2.

In a further embodiment, the invention relates to compounds of the formula (I) in which R^1, R^2, R^3, R^4, R^5, R^6, R^7, R^8, A^1, A^2, A^3 and n have the meanings described above, in particular the meanings described in configuration (1) or configuration (2) or configuration (3) or configuration (4) or configuration (5-1) or configuration (5-2) or configuration (6-1) or configuration (6-2) or configuration (6-3), where R^8 may only represent not cyclically attached radicals.

In a further embodiment, the invention relates to compounds of the formula (I) in which R^1, R^2, R^3, R^4, R^5, R^6, R^7, R^8, A^1, A^2, A^3 and n have the meanings described above, in particular the meanings described in configuration (1) or configuration (2) or configuration (3) or configuration (4) or configuration (5-2) or configuration (6-2) or configuration (6-3), where R^8 may only represent cyclically attached radicals.

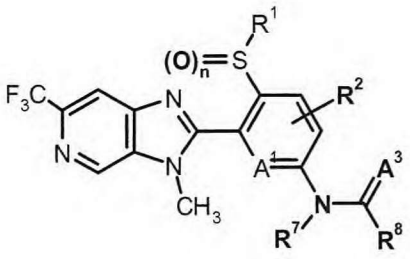
In a further embodiment, the invention relates to compounds of the formula (I-A)



(I-A)

where A^1, A^3, R^1, R^2, R^7, R^8 and n have the meanings described above, in particular the meanings described in configuration (1) or configuration (2) or configuration (3) or configuration (4) or configuration (5-1) or configuration (5-2) or configuration (6-1) or configuration (6-2) or configuration (6-3).

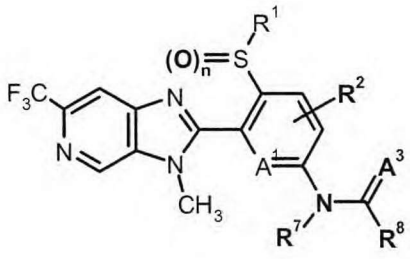
In a further embodiment, the invention relates to compounds of the formula (I-A)



(I-A)

where A^1, A^3, R^1, R^2, R^7, R^8 and n have the meanings described above, in particular the meanings described in configuration (1) or configuration (2) or configuration (3) or configuration (4) or configuration (5-1) or configuration (5-2) or configuration (6-1) or configuration (6-2) or configuration (6-3), where R^8 may only represent not cyclically attached radicals.

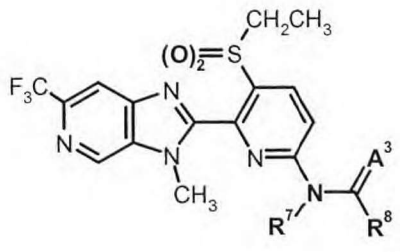
In a further embodiment, the invention relates to compounds of the formula (I-A)



(I-A)

where A^1, A^3, R^1, R^2, R^7, R^8 and n have the meanings described above, in particular the meanings described in configuration (1) or configuration (2) or configuration (3) or configuration (4) or configuration (5-2) or configuration (6-2) or configuration (6-3), where R^8 may only represent cyclically attached radicals.

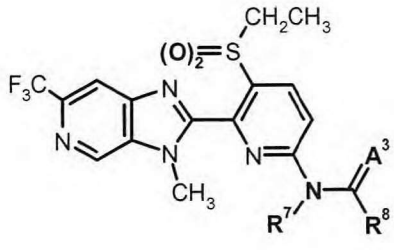
In a further embodiment, the invention relates to compounds of the formula (I-B)



(I-B)

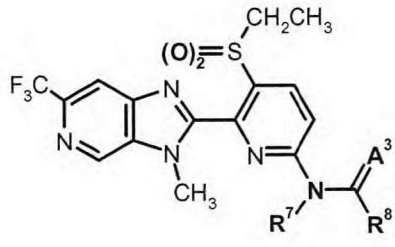
where A^3, R^7 and R^8 have the meanings described above, in particular the meanings described in configuration (1) or configuration (2) or configuration (3) or configuration (4) or configuration (5-1) or configuration (5-2) or configuration (6-1) or configuration (6-2) or configuration (6-3).

In a further embodiment, the invention relates to compounds of the formula (I-B)


(I-B)

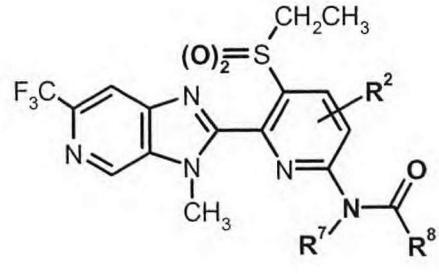
where A^3, R^7 and R^8 have the meanings described above, in particular the meanings described in configuration (1) or configuration (2) or configuration (3) or configuration (4) or configuration (5-1) or configuration (5-2) or configuration (6-1) or configuration (6-2) or configuration (6-3), where R^8 may only represent not cyclically attached radicals.

In a further embodiment, the invention relates to compounds of the formula (I-B)


(I-B)

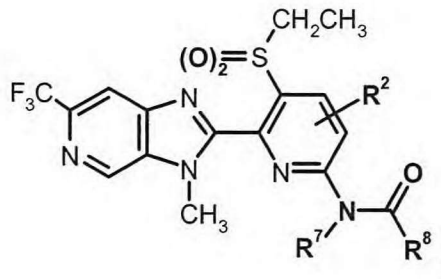
where A^3, R^7 and R^8 have the meanings described above, in particular the meanings described in configuration (1) or configuration (2) or configuration (3) or configuration (4) or configuration (5-2) or configuration (6-2) or configuration (6-3), where R^8 may only represent cyclically attached radicals.

In a further embodiment, the invention relates to compounds of the formula (I-C)


(I-C)

where R^2, R^7 and R^8 have the meanings described above, in particular the meanings described in configuration (1) or configuration (2) or configuration (3) or configuration (4) or configuration (5-1) or configuration (5-2) or configuration (6-1) or configuration (6-2) or configuration (6-3).

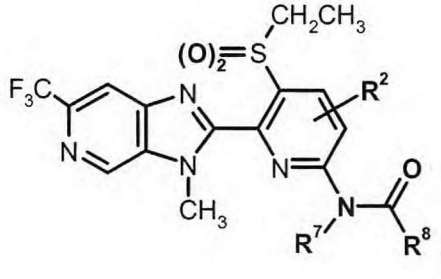
In a further embodiment, the invention relates to compounds of the formula (I-C)



(I-C)

where R^2, R^7 and R^8 have the meanings described above, in particular the meanings described in configuration (1) or configuration (2) or configuration (3) or configuration (4) or configuration (5-1) or configuration (5-2) or configuration (6-1) or configuration (6-2) or configuration (6-3), where R^8 may only represent not cyclically attached radicals.

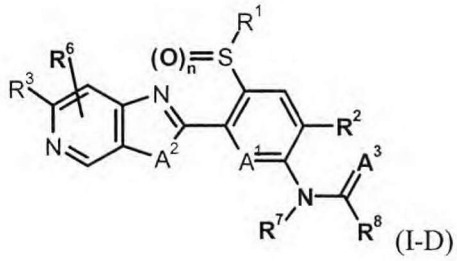
In a further embodiment, the invention relates to compounds of the formula (I-C)



(I-C)

where R^2, R^7 and R^8 have the meanings described above, in particular the meanings described in configuration (1) or configuration (2) or configuration (3) or configuration (4) or configuration (5-2) or configuration (6-2) or configuration (6-3), where R^8 may only represent cyclically attached radicals.

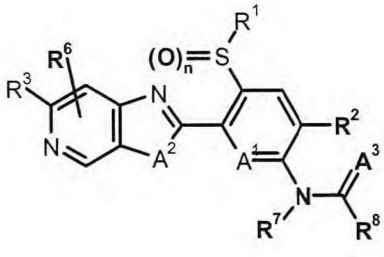
In a further embodiment, the invention relates to compounds of the formula (I-D)



(I-D)

where R^1, R^2, R^3, R^4, R^5, R^6, R^7, R^8, A^1, A^2, A^3 and n have the meanings described above, in particular the meanings described in configuration (1) or configuration (2) or configuration (3) or configuration (4) or configuration (5-1) or configuration (5-2) or configuration (6-1) or configuration (6-2) or configuration (6-3).

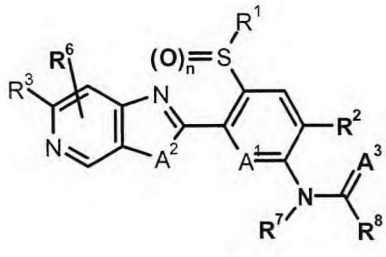
In a further embodiment, the invention relates to compounds of the formula (I-D)



(I-D)

where R^1, R^2, R^3, R^4, R^5, R^6, R^7, R^8, A^1, A^2, A^3 and n have the meanings described above, in particular the meanings described in configuration (1) or configuration (2) or configuration (3) or configuration (4) or configuration (5-1) or configuration (5-2) or configuration (6-1) or configuration (6-2) or configuration (6-3), where R^8 may only represent not cyclically attached radicals.

In a further embodiment, the invention relates to compounds of the formula (I-D)



(I-D)

where R^1, R^2, R^3, R^4, R^5, R^6, R^7, R^8, A^1, A^2, A^3 and n have the meanings described above, in particular the meanings described in configuration (1) or configuration (2) or configuration (3) or configuration (4) or configuration (5-2) or configuration (6-2) or configuration (6-3), where R^8 may only represent cyclically attached radicals.

In the preferred definitions, unless stated otherwise,

halogen is selected from the group of fluorine, chlorine, bromine and iodine, preferably in turn from the group of fluorine, chlorine and bromine,

aryl (including as part of a larger unit, for example arylalkyl) is selected from the group of phenyl, benzyl, naphthyl, anthryl, phenanthrenyl, and is preferably in turn phenyl,

hetaryl (synonymous with heteroaryl, including as part of a larger unit, for example hetarylalkyl) is selected from the group of furyl, thienyl, pyrrolyl, pyrazolyl, imidazolyl, triazolyl, oxazolyl, isoxazolyl, thiazolyl, isothiazolyl, 1,2,3-oxadiazolyl, 1,2,4-oxadiazolyl, 1,3,4-oxadiazolyl, 1,2,5-oxadiazolyl, 1,2,3-thiadiazolyl, 1,2,4-thiadiazolyl, 1,3,4-thiadiazolyl, 1,2,5-thiadiazolyl, tetrazolyl, pyridyl, pyrimidyl, pyridazinyl, pyrazinyl, 1,2,3-triazinyl, 1,2,4-triazinyl, 1,3,5-triazinyl, benzofuryl, benzisofuryl, benzothienyl, benzisothienyl, indolyl, isoindolyl, indazolyl, benzothiazolyl, benzisothiazolyl, benzoxazolyl, benzisoxazolyl, benzimidazolyl, 2,1,3-benzoxadiazole, quinolinyl, isoquinolinyl,

cinnolinyl, phthalazinyl, quinazolinyl, quinoxalinyl, naphthyridinyl, benzotriazinyl, purinyl, pteridinyl and indolizinyl,

heterocyclyl is a saturated 4-, 5- or 6-membered ring containing 1 or 2 nitrogen atoms and/or one oxygen atom and/or one sulfur atom, for example azetidinyl, pyrrolidinyl, piperidinyl, oxetanyl, tetrahydrofuranyl, tetrahydropyranyl, dioxanyl, thietanyl, tetrahydrothiophenyl, tetrahydrothiopyranyl, piperazinyl, morpholinyl and thiomorpholinyl.

In the particularly preferred definitions, unless stated otherwise,

halogen is selected from the group of fluorine, chlorine, bromine and iodine, preferably in turn from the group of fluorine, chlorine and bromine,

aryl (including as part of a larger unit, for example arylalkyl) is selected from the group of phenyl, benzyl, naphthyl, anthryl, phenanthrenyl, and is preferably in turn phenyl,

hetaryl (including as part of a larger unit, for example hetarylalkyl) is selected from the group consisting of pyridyl, pyrimidyl, pyrazinyl, pyridazinyl, pyrazolyl, imidazolyl, triazolyl, thiazolyl and tetrazolyl,

heterocyclyl is selected from the group consisting of oxetanyl, tetrahydrofuryl and piperazinyl.

In the context of the present invention, unless defined differently elsewhere, the term "alkyl", either on its own or else in combination with further terms, for example haloalkyl, is understood to mean a radical of a saturated, aliphatic hydrocarbon group which has 1 to 12 carbon atoms and may be branched or unbranched. Examples of C_1-C_{12}-alkyl radicals are methyl, ethyl, n-propyl, isopropyl, n-butyl, isobutyl, sec-butyl, tert-butyl, n-pentyl, isopentyl, neopentyl, tert-pentyl, 1-methylbutyl, 2-methylbutyl, 1-ethylpropyl, 1,2-dimethylpropyl, hexyl, n-heptyl, n-octyl, n-nonyl, n-decyl, n-undecyl and n-dodecyl. Among these alkyl radicals, particular preference is given to C_1-C_6-alkyl radicals. Special preference is given to C_1-C_4-alkyl radicals.

According to the invention, unless defined differently elsewhere, the term "alkenyl", either on its own or else in combination with further terms, is understood to mean a straight-chain or branched C_2-C_{12}-alkenyl radical which has at least one double bond, for example vinyl, allyl, 1-propenyl, isopropenyl, 1-butenyl, 2-butenyl, 3-butenyl, 1,3-butadienyl, 1-pentenyl, 2-pentenyl, 3-pentenyl, 4-pentenyl, 1,3-pentadienyl, 1-hexenyl, 2-hexenyl, 3-hexenyl, 4-hexenyl, 5-hexenyl and 1,4-hexadienyl. Among these, preference is given to C_2-C_6-alkenyl radicals and particular preference to C_2-C_4-alkenyl radicals.

According to the invention, unless defined differently elsewhere, the term "alkynyl", either on its own or else in combination with further terms, is understood to mean a straight-chain or branched C_2-C_{12}-alkynyl radical which has at least one triple bond, for example ethynyl, 1-propynyl and propargyl. Among these, preference is given to C_3-C_6-alkynyl radicals and particular preference to C_3-C_4-alkynyl radicals. The alkynyl radical may also contain at least one double bond.

According to the invention, unless defined differently elsewhere, the term "cycloalkyl", either on its own or else in combination with further terms, is understood to mean a C_3-C_8-cycloalkyl radical, for example cyclopropyl, cyclobutyl, cyclopentyl, cyclohexyl, cycloheptyl and cyclooctyl. Among these, preference is given to C_3-C_6-cycloalkyl radicals.

The term "alkoxy", either on its own or else in combination with further terms, for example haloalkoxy, is understood in the present case to mean an O-alkyl radical, where the term "alkyl" is as defined above.

Halogen-substituted radicals, for example haloalkyl, are mono- or polyhalogenated, up to the maximum number of possible substituents. In the case of polyhalogenation, the halogen atoms may be identical or different. Halogen here is fluorine, chlorine, bromine or iodine, especially fluorine, chlorine or bromine.

Unless stated otherwise, optionally substituted radicals may be mono- or polysubstituted, where the substituents in the case of polysubstitutions may be the same or different.

The radical definitions or illustrations given in general terms or listed within ranges of preference apply correspondingly to end products and to starting materials and intermediates. These radical definitions can be combined with one another as desired, i.e. including combinations between the respective ranges of preference.

Preference according to the invention is given to using compounds of the formula (I) which contain a combination of the meanings listed above as being preferred.

Particular preference according to the invention is given to using compounds of the formula (I) which contain a combination of the meanings listed above as being particularly preferred.

Very particular preference according to the invention is given to using compounds of the formula (I) which contain a combination of the definitions listed above as being very particularly preferred.

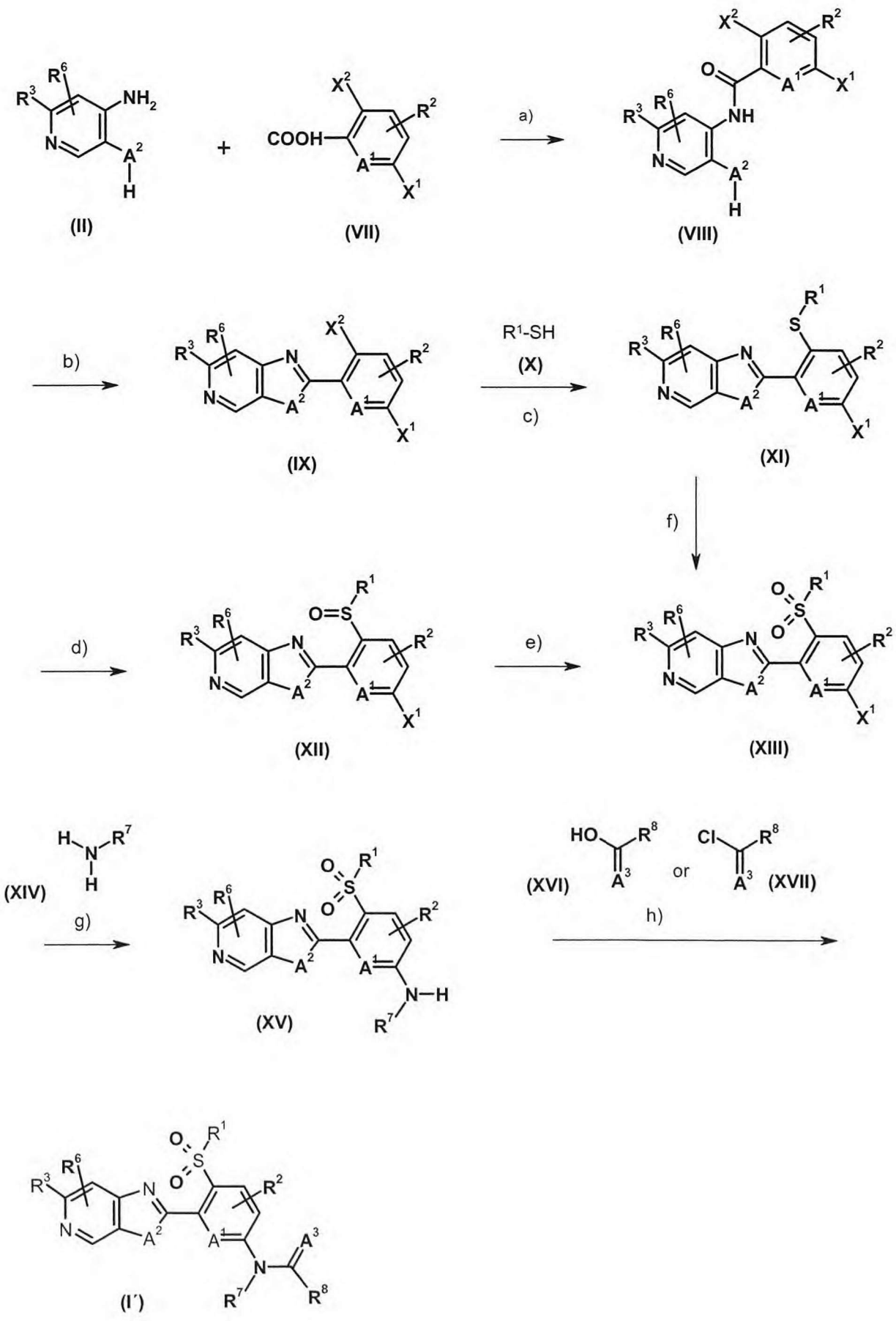
Most preference according to the invention is given to using compounds of the formula (I) which contain a combination of the meanings listed above as being most preferable.

Especially used according to the invention are compounds of the formula (I) which contain a combination of the meanings listed above as being especially emphasized.

Depending on the nature of the substituents, the compounds of the formula (I) may take the form of geometric and/or optically active isomers or corresponding isomer mixtures in different compositions. These stereoisomers are, for example, enantiomers, diastereomers, atropisomers or geometric isomers. The invention therefore encompasses pure stereoisomers and any desired mixtures of these isomers.

The inventive compounds of the formula (I) can be obtained by the processes shown in the following schemes:

Process A



The radicals R^1, R^2, R^3, R^6, R^7, R^8, A^1, A^2 and A^3 have the meanings described above and X^1 and X^2 represent halogen.

Step a)

The compounds of the formula (VIII) can be prepared in analogy to the process described in US5576335 by the reaction of compounds of the formula (II) with a carboxylic acid of the formula (VII) in the presence of a condensing agent or a base.

Compounds of the formula (II) are either commercially available or can be prepared by known methods, for example analogously to the processes described in US2003/69257 or WO2006/65703.

Carboxylic acids of the formula (VII) are either commercially available or can be prepared by known methods, for example analogously to the processes described in US2010/234604, WO2012/61926 or Bioorganic and Medicinal Chemistry Letters, **18** (2008), 5023-5026.

The reaction of the compounds of the formula (II) with carboxylic acids of the formula (VII) can be effected neat or in a solvent, preference being given to conducting the reaction in a solvent selected from customary solvents that are inert under the prevailing reaction conditions. Preference is given to ethers, for example diisopropyl ether, dioxane, tetrahydrofuran, 1,2-dimethoxyethane; halogenated hydrocarbons, for example dichloromethane, chloroform, carbon tetrachloride, 1,2-dichloroethane or chlorobenzene; nitriles, for example acetonitrile or propionitrile; aromatic hydrocarbons, for example toluene or xylene; aprotic polar solvents, for example N,N-dimethylformamide or N-methylpyrrolidone, or nitrogen compounds, for example pyridine.

Suitable condensing agents are, for example, carbodiimides such as 1-(3-dimethylaminopropyl)-3-ethylcarbodiimide hydrochloride (EDCI) or 1,3-dicyclohexylcarbodiimide.

Suitable bases are inorganic bases which are typically used in such reactions. Preference is given to using bases selected by way of example from the group consisting of acetates, phosphates, carbonates and hydrogencarbonates of alkali metals or alkaline earth metals. Particular preference is given here to sodium acetate, sodium phosphate, potassium phosphate, caesium carbonate, sodium carbonate, potassium carbonate, sodium hydrogencarbonate, potassium hydrogencarbonate.

The reaction can be effected under reduced pressure, at standard pressure or under elevated pressure and at temperatures of 0°C to 180°C; with preference, the reaction is carried out at standard pressure and temperatures of 20 to 140°C.

Step b)

The compounds of the formula (IX) can be prepared by condensing the intermediates of the formula (VIII), for example analogously to the processes described in WO2012/86848.

The conversion to compounds of the formula (IX) can be effected neat or in a solvent, preference being given to conducting the reaction in a solvent selected from customary solvents that are inert under the prevailing reaction conditions. Preference is given to ethers, for example diisopropyl ether, dioxane, tetrahydrofuran, 1,2-dimethoxyethane, tert-butyl methyl ether; halogenated hydrocarbons, for example dichloromethane, chloroform, carbon tetrachloride, 1,2-dichloroethane or chlorobenzene; nitriles, for example acetonitrile or propionitrile; aromatic hydrocarbons, for example toluene or xylene; aprotic polar solvents, for example N,N-dimethylformamide or N-methylpyrrolidone, or nitrogen compounds, for example pyridine.

The reaction can be carried out in the presence of a condensing agent, an acid, a base or a chlorinating agent.

Examples of suitable condensing agents are carbodiimides such as 1-(3-dimethylaminopropyl)-3-ethylcarbodiimide hydrochloride (EDCI) or 1,3-dicyclohexylcarbodiimide; anhydrides such as acetic anhydride, trifluoroacetic anhydride; a mixture of triphenylphosphine, a base and carbon tetrachloride, or a mixture of triphenylphosphine and an azo diester, for example diethylazodicarboxylic acid.

Examples of suitable acids which can be used in the reaction described are sulfonic acids such as para-toluenesulfonic acid; carboxylic acids such as acetic acid, or polyphosphoric acids.

Examples of suitable bases are nitrogen heterocycles such as pyridine, picoline, 2,6-lutidine, 1,8-diazabicyclo[5.4.0]-7-undecene (DBU); tertiary amines such as triethylamine and N,N-diisopropylethylamine; inorganic bases such as potassium phosphate, potassium carbonate and sodium hydride.

An example of a suitable chlorinating agent is phosphorus oxychloride.

The reaction can be conducted under reduced pressure, at standard pressure or under elevated pressure, and at temperatures of 0°C to 200°C.

Step c)

The compounds of the formula (XI) can be prepared by reacting the compounds of the formula (IX) with the compounds of the formula (X) in the presence of a base.

Mercaptan derivatives of the formula (X), for example methyl mercaptan, ethyl mercaptan or isopropyl mercaptan, are either commercially available or can be prepared by known methods, for example

analogously to the processes described in US2006/25633, US2006/111591, US2820062, Chemical Communications, **13** (2000), 1163-1164 or Journal of the American Chemical Society, **44** (1922), p. 1329.

The conversion to compounds of the formula (XI) can be effected neat or in a solvent, preference being given to conducting the reaction in a solvent selected from customary solvents that are inert under the prevailing reaction conditions. Preference is given to ethers, for example diisopropyl ether, dioxane, tetrahydrofuran, 1,2-dimethoxyethane, tert-butyl methyl ether; nitriles, for example acetonitrile or propionitrile; aromatic hydrocarbons, for example toluene or xylene; aprotic polar solvents, for example N,N-dimethylformamide, N-methylpyrrolidone or dimethyl sulfoxide.

Examples of suitable bases are inorganic bases from the group consisting of acetates, phosphates and carbonates of alkali metals or alkaline earth metals. Preference is given here to caesium carbonate, sodium carbonate and potassium carbonate. Further suitable bases are alkali metal hydrides, for example sodium hydride.

The reaction can be conducted under reduced pressure, at standard pressure or under elevated pressure, and at temperatures of 0°C to 200°C.

Step d)

The compounds of the formula (XII) can be prepared by oxidizing the compounds of the formula (XI). The oxidation is generally carried out in a solvent selected from customary solvents which are inert under the prevailing reaction conditions. Preference is given to halogenated hydrocarbons, for example dichloromethane, chloroform, carbon tetrachloride, 1,2-dichloroethane or chlorobenzene; alcohols such as methanol or ethanol; formic acid, acetic acid, propionic acid or water.

Examples of suitable oxidizing agents are hydrogen peroxide, meta-chloroperbenzoic acid or sodium periodate.

The reaction can be carried out under reduced pressure, at atmospheric pressure or under elevated pressure, and at temperatures of -20°C to 120°C.

Step e)

The compounds of the formula (XIII) can be prepared by oxidizing the compounds of the formula (XII). The oxidation is generally carried out in a solvent. Preference is given to halogenated hydrocarbons, for example dichloromethane, chloroform, carbon tetrachloride, 1,2-dichloroethane or chlorobenzene; alcohols such as methanol or ethanol; formic acid, acetic acid, propionic acid or water.

Examples of suitable oxidizing agents are hydrogen peroxide and meta-chloroperbenzoic acid.

The reaction can be carried out under reduced pressure, at atmospheric pressure or under elevated pressure, and at temperatures of -20°C to 120°C.

Step f)

The compounds of the formula (XIII) can also be prepared in a one-step process by oxidizing the compounds of the formula (XI). The oxidation is generally carried out in a solvent. Preference is given to halogenated hydrocarbons, for example dichloromethane, chloroform, carbon tetrachloride, 1,2-dichloroethane or chlorobenzene; alcohols such as methanol or ethanol; formic acid, acetic acid, propionic acid or water.

Examples of suitable oxidizing agents are hydrogen peroxide and meta-chloroperbenzoic acid.

The reaction can be carried out under reduced pressure, at atmospheric pressure or under elevated pressure, and at temperatures of -20°C to 120°C.

Step g)

The compounds of the formula (XV) can be prepared by reacting compounds of the formula (XIII) with compounds of the formula (XIV).

Compounds of the formula (XIV) are either commercially available or can be prepared by known methods.

The conversion to compounds of the formula (XV) is generally carried out in a solvent. Preference is given to ethers such as, for example, tetrahydrofuran, methyl tert-butyl ether, dioxane, ethylene glycol dimethyl ether, aliphatic hydrocarbons such as hexane, heptane, aromatic hydrocarbons such as toluene, xylene, halogenated hydrocarbons such as, for example, dichloromethane, chloroform, carbon tetrachloride, 1,2-dichloroethane or chlorobenzene, aprotic polar solvents such as, for example, N,N-dimethylformamide, N-methylpyrrolidone, dimethyl sulfoxide, or esters such as, for example, ethyl acetate, or nitriles such as acetonitrile.

The reaction can be carried out in the presence of a base. Examples of suitable bases are nitrogen heterocycles such as pyridine, picoline, 2,6-lutidine, 1,8-diazabicyclo[5.4.0]-7-undecene (DBU); tertiary amines such as triethylamine and N,N-diisopropylethylamine; or inorganic bases such as potassium phosphate, potassium carbonate and sodium hydride.

Step h)

The compounds of the formula (I′) can be prepared by reacting compounds of the formula (XVI) with compounds of the formula (XV).

Compounds of the formulae (XVI) are either commercially available or can be prepared by known methods.

The conversion to compounds of the formula (I′) is generally carried out in a solvent. Preference is given to ethers such as, for example, tetrahydrofuran, methyl tert-butyl ether, dioxane, ethylene glycol dimethyl ether, halogenated hydrocarbons such as, for example, dichloromethane, chloroform, carbon tetrachloride, 1,2-dichloroethane or chlorobenzene, aromatic hydrocarbons such as toluene, xylene, esters such as, for example, ethyl acetate, nitriles such as acetonitrile, aprotic polar solvents such as, for example, N,N-dimethylformamide, N-methylpyrrolidone, dimethyl sulfoxide or nitrogenous heterocycles such as pyridine or quinoline.

The reaction can be carried out in the presence of a condensing agent. Examples of suitable condensing agents are carbodiimides such as 1-(3-dimethylaminopropyl)-3-ethylcarbodiimide hydrochloride (EDCI) and 1,3-dicyclohexylcarbodiimide.

The reaction can be carried out in the presence of a suitable catalyst. An example of a suitable catalyst is 1-hydroxybenzotriazole.

The compounds of the formula (I′) can also be prepared by reacting compounds of the formula (XVII) with compounds of the formula (XV).

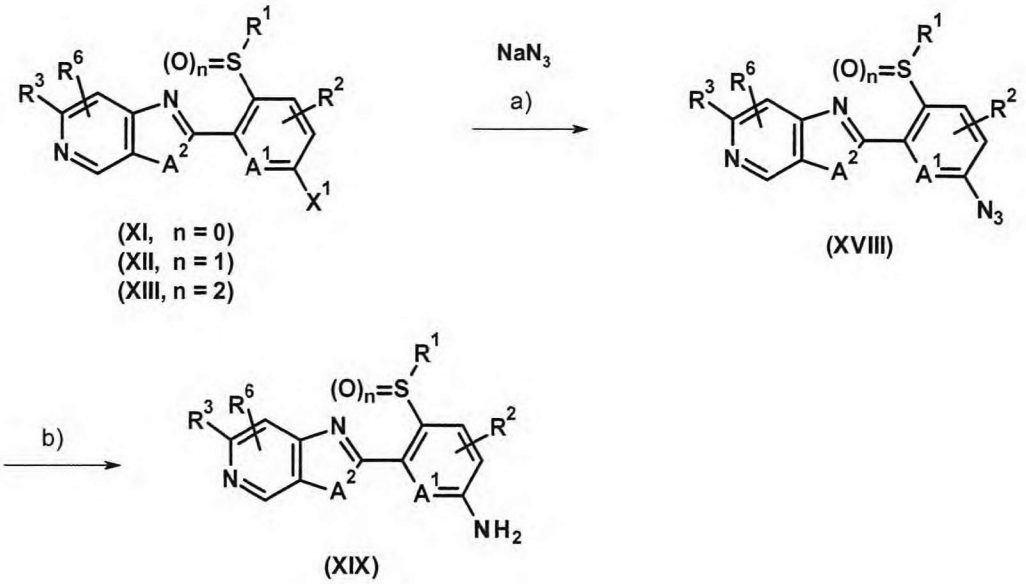
Compounds of the formula (XVII) are either commercially available or can be prepared by known methods.

The conversion to compounds of the formula (I′) is generally carried out in a solvent. Preference is given to ethers such as, for example, tetrahydrofuran, methyl tert-butyl ether, dioxane, ethylene glycol dimethyl ether, aliphatic hydrocarbons such as hexane, heptane, aromatic hydrocarbons such as toluene, xylene, halogenated hydrocarbons such as, for example, dichloromethane, chloroform, carbon tetrachloride, 1,2-dichloroethane or chlorobenzene, aprotic polar solvents such as, for example, N,N-dimethylformamide, N-methylpyrrolidone, dimethyl sulfoxide, or esters such as, for example, ethyl acetate, or nitriles such as acetonitrile.

The reaction can be carried out in the presence of a base. Examples of suitable bases are nitrogen heterocycles such as pyridine, dimethylaminopyridine, picoline, 2,6-lutidine, 1,8-diazabicyclo[5.4.0]-7-undecene (DBU); tertiary amines such as triethylamine and N,N-diisopropylethylamine; or inorganic bases such as potassium carbonate and sodium hydride.

The reaction according to steps g) and h) can also take place starting from compounds of the formula (XI) or the formula (XII).

Process B



(XI, n = 0)
(XII, n = 1)
(XIII, n = 2)

(XVIII)

(XIX)

The radicals R^1, R^2, R^3, R^6, A^1 and A^2 have the meanings described above and X^1 represents halogen.

Step a)

The compounds of the formula (XVIII) can be prepared analogously to WO2015/002211 by reacting the compounds of the formula (XI, XII or XIII) with sodium azide.

The conversion to compounds of the formula (XVIII) is usually carried out in a solvent, preference being given to carrying out the reaction in a solvent selected from customary solvents that are inert under the prevailing reaction conditions. Preference is given to ethers such as, for example, tetrahydrofuran, ethylene glycol dimethyl ether, dioxane, aprotic polar solvents such as, for example, N,N-dimethylformamide, N-methylpyrrolidone, dimethyl sulfoxide, or alcohols such as methanol or ethanol.

Step b)

The compounds of the formula (XIX) can be prepared by reducing the intermediates of the formula (XVIII), for example analogously to the processes described in WO2015/002211.

Examples of suitable reducing agents are triphenylphosphine, tributylphosphine, tin(III) chloride and zinc.

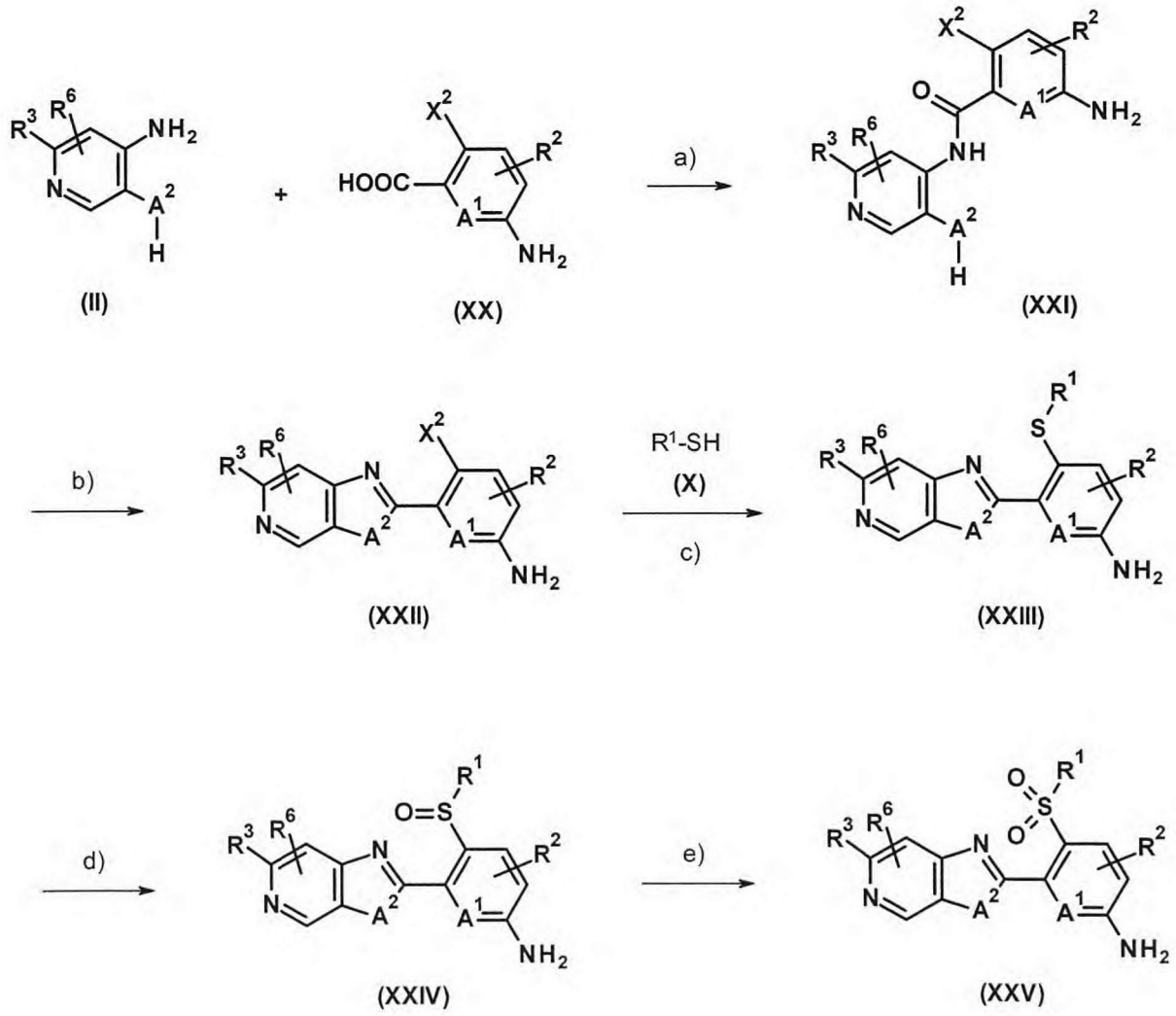
The conversion to compounds of the formula (XIX) is generally carried out in a solvent. Preference is given to ethers such as, for example, tetrahydrofuran, ethylene glycol dimethyl ether, dioxane, aliphatic hydrocarbons such as hexane, heptane, aromatic hydrocarbons such as toluene, xylene, halogenated hydrocarbons such as, for example, dichloromethane, chloroform, carbon tetrachloride, 1,2-

dichloroethane or chlorobenzene, aprotic polar solvents such as, for example, N,N-dimethylformamide, N-methylpyrrolidone, dimethyl sulfoxide, or alcohols such as methanol or ethanol.

If required, an acid such as, for example, hydrochloric acid or acetic acid may be added to the reaction.

The further conversion of the compounds of the formula (XIX) to compounds of the formula (I) is effected analogously to process A.

Process C



The radicals R^1, R^2, R^3, R^6, A^1 and A^2 have the meanings described above and X^2 represents halogen.

Step a)

The compounds of the formula (XXI) can be prepared in analogy to the process described in US5576335 by the reaction of compounds of the formula (II) with a carboxylic acid of the formula (XX) in the presence of a condensing agent or a base.

Compounds of the formula (II) are either commercially available or can be prepared by known methods, for example analogously to the processes described in US2003/69257 or WO2006/65703.

Carboxylic acids of the formula (XX) are either commercially available or can be prepared by known methods, for example analogously to the processes described in US2010/234604, WO2012/61926 or Bioorganic and Medicinal Chemistry Letters, **18** (2008), 5023-5026.

The reaction of the compounds of the formula (II) with carboxylic acids of the formula (XX) can be effected neat or in a solvent, preference being given to conducting the reaction in a solvent selected from customary solvents that are inert under the prevailing reaction conditions. Preference is given to ethers, for example diisopropyl ether, dioxane, tetrahydrofuran, 1,2-dimethoxyethane; halogenated hydrocarbons, for example dichloromethane, chloroform, carbon tetrachloride, 1,2-dichloroethane or chlorobenzene; nitriles, for example acetonitrile or propionitrile; aromatic hydrocarbons, for example toluene or xylene; aprotic polar solvents, for example N,N-dimethylformamide or N-methylpyrrolidone, or nitrogen compounds, for example pyridine.

Suitable condensing agents are, for example, carbodiimides such as 1-(3-dimethylaminopropyl)-3-ethylcarbodiimide hydrochloride (EDCI) or 1,3-dicyclohexylcarbodiimide.

Suitable bases are inorganic bases which are typically used in such reactions. Preference is given to using bases selected by way of example from the group consisting of acetates, phosphates, carbonates and hydrogencarbonates of alkali metals or alkaline earth metals. Particular preference is given here to sodium acetate, sodium phosphate, potassium phosphate, caesium carbonate, sodium carbonate, potassium carbonate, sodium hydrogencarbonate, potassium hydrogencarbonate.

The reaction can be effected under reduced pressure, at standard pressure or under elevated pressure and at temperatures of 0°C to 180°C; with preference, the reaction is carried out at standard pressure and temperatures of 20 to 140°C.

Step b)

The compounds of the formula (XXII) can be prepared by condensing the compounds of the formula (XXI), for example analogously to the processes described in WO2012/86848.

The conversion to compounds of the formula (XXII) can be carried out neat or in a solvent, preference being given to conducting the reaction in a solvent selected from customary solvents that are inert under

the prevailing reaction conditions. Preference is given to ethers, for example diisopropyl ether, dioxane, tetrahydrofuran, 1,2-dimethoxyethane, tert-butyl methyl ether; halogenated hydrocarbons, for example dichloromethane, chloroform, carbon tetrachloride, 1,2-dichloroethane or chlorobenzene; nitriles, for example acetonitrile or propionitrile; aromatic hydrocarbons, for example toluene or xylene; aprotic polar solvents, for example N,N-dimethylformamide or N-methylpyrrolidone, or nitrogen compounds, for example pyridine.

The reaction can be carried out in the presence of a condensing agent, an acid, a base or a chlorinating agent.

Examples of suitable condensing agents are carbodiimides such as 1-(3-dimethylaminopropyl)-3-ethylcarbodiimide hydrochloride (EDCI) or 1,3-dicyclohexylcarbodiimide; anhydrides such as acetic anhydride, trifluoroacetic anhydride; a mixture of triphenylphosphine, a base and carbon tetrachloride, or a mixture of triphenylphosphine and an azo diester, for example diethylazodicarboxylic acid.

Examples of suitable acids which can be used in the reaction described are sulfonic acids such as para-toluenesulfonic acid; carboxylic acids such as acetic acid, or polyphosphoric acids.

Examples of suitable bases are nitrogen heterocycles such as pyridine, picoline, 2,6-lutidine, 1,8-diazabicyclo[5.4.0]-7-undecene (DBU); tertiary amines such as triethylamine and N,N-diisopropylethylamine; inorganic bases such as potassium phosphate, potassium carbonate and sodium hydride.

An example of a suitable chlorinating agent is phosphorus oxychloride.

The reaction can be conducted under reduced pressure, at standard pressure or under elevated pressure, and at temperatures of 0°C to 200°C.

Step c)

The compounds of the formula (XXIII) can be prepared by reacting the compounds of the formula (XXII) with the compounds of the formula (X) in the presence of a base.

Mercaptan derivatives of the formula (X), for example methyl mercaptan, ethyl mercaptan or isopropyl mercaptan, are either commercially available or can be prepared by known methods, for example analogously to the processes described in US2006/25633, US2006/111591, US2820062, Chemical Communications, **13** (2000), 1163-1164 or Journal of the American Chemical Society, **44** (1922), p. 1329.

The conversion to compounds of the formula (XXIII) can be carried out neat or in a solvent, preference being given to conducting the reaction in a solvent selected from customary solvents that are inert under the prevailing reaction conditions. Preference is given to ethers, for example diisopropyl ether, dioxane, tetrahydrofuran, 1,2-dimethoxyethane, tert-butyl methyl ether; nitriles, for example acetonitrile or

propionitrile; aromatic hydrocarbons, for example toluene or xylene; aprotic polar solvents, for example N,N-dimethylformamide, N-methylpyrrolidone or dimethyl sulfoxide.

Examples of suitable bases are inorganic bases from the group consisting of acetates, phosphates and carbonates of alkali metals or alkaline earth metals. Preference is given here to caesium carbonate, sodium carbonate and potassium carbonate. Further suitable bases are alkali metal hydrides, for example sodium hydride.

The reaction can be conducted under reduced pressure, at standard pressure or under elevated pressure, and at temperatures of 0°C to 200°C.

Step d)

The compounds of the formula (XXIV) can be prepared by oxidizing the compounds of the formula (XXIII). The oxidation is generally carried out in a solvent selected from customary solvents which are inert under the prevailing reaction conditions. Preference is given to halogenated hydrocarbons, for example dichloromethane, chloroform, carbon tetrachloride, 1,2-dichloroethane or chlorobenzene; alcohols such as methanol or ethanol; formic acid, acetic acid, propionic acid or water.

Examples of suitable oxidizing agents are hydrogen peroxide, meta-chloroperbenzoic acid or sodium periodate.

The reaction can be carried out under reduced pressure, at atmospheric pressure or under elevated pressure, and at temperatures of -20°C to 120°C.

Step e)

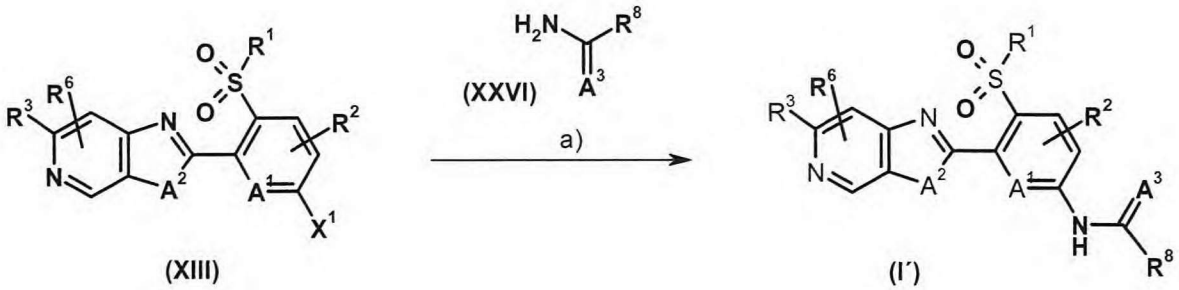
The compounds of the formula (XXV) can be prepared by oxidizing the compounds of the formula (XXIV). The oxidation is generally carried out in a solvent. Preference is given to halogenated hydrocarbons, for example dichloromethane, chloroform, carbon tetrachloride, 1,2-dichloroethane or chlorobenzene; alcohols such as methanol or ethanol; formic acid, acetic acid, propionic acid or water.

Examples of suitable oxidizing agents are hydrogen peroxide and meta-chloroperbenzoic acid.

The reaction can be carried out under reduced pressure, at atmospheric pressure or under elevated pressure, and at temperatures of -20°C to 120°C.

The further conversion of the compounds of the formula (XXV) or of the formula (XXIV) or of the formula (XXIII) to compounds of the formula (I) is carried out analogously to process A.

Process D



The radicals R^1, R^2, R^3, R^6, R^8, A^1, A^2 and A^3 have the meanings described above and X^1 represents halogen.

Step a)

The compounds of the formula (I′) can be prepared in a one-step process by reacting the compounds of the formula (XIII) with compounds of the formula (XXVI) analogously to the processes described in Synthesis, (2005), 915-924 or Organic Letters, **11** (2009), 947-950.

Compounds of the formula (XXVI) are either commercially available or can be prepared by known methods, for example analogously to the processes described in Houben-Weyl, Methoden der organischen Chemie [Methods of Organic Chemistry], volume XVI/2, 4th edition.

The conversion to compounds of the formula (I′) is generally carried out in a solvent in the presence of a base. Preferred solvents are ethers such as dioxane or ethylene glycol dimethyl ether, preferred bases are, for example, caesium carbonate, potassium phosphate or sodium tert-butoxide.

The conversion to compounds of the formula (I′) is generally carried out in the presence of a catalyst and a ligand. Suitable for use as catalysts are palladium complexes such as, for example, tris(dibenzylideneacetone)dipalladium(0) or palladium acetate and the ligands employed are generally organophosphane compounds such as, for example, bis(diphenylphosphine)-9,9-dimethylxanthene (xanthphos).

Methods and uses

The invention also relates to methods for controlling animal pests, in which compounds of the formula (I) are allowed to act on animal pests and/or their habitat. The control of the animal pests is preferably carried out in agriculture and forestry, and in material protection. This preferably excludes methods for surgical or therapeutic treatment of the human or animal body and diagnostic methods carried out on the human or animal body.

The invention further relates to the use of the compounds of the formula (I) as pesticides, especially crop protection compositions.

In the context of the present application, the term "pesticide" in each case also always encompasses the term "crop protection composition".

The compounds of the formula (I), given good plant tolerance, favourable endotherm toxicity and good environmental compatibility, are suitable for protecting plants and plant organs against biotic and abiotic stress factors, for increasing harvest yields, for improving the quality of the harvested material and for controlling animal pests, especially insects, arachnids, helminths, especially nematodes and molluscs, which are encountered in agriculture, in horticulture, in animal husbandry, in aquatic cultures, in forests, in gardens and leisure facilities, in the protection of stored products and of materials, and in the hygiene sector.

In the context of the present patent application, the term "hygiene" should be understood to mean any and all measures, provisions and procedures which have the aim of preventing diseases, especially infection diseases, and which serve to protect the health of humans and animals and/or protect the environment and/or maintain cleanliness. According to the invention, this especially includes measures for cleaning, disinfection and sterilization, for example of textiles or hard surfaces, especially surfaces made of glass, wood, cement, porcelain, ceramic, plastic or else metal(s), in order to ensure that these are free of hygiene pests and/or their secretions. The scope of protection of the invention in this regard preferably excludes surgical or therapeutic treatment procedures to be applied to the human body or the bodies of animals, and diagnostic procedures which are carried out on the human body or the bodies of animals.

The term "hygiene sector" covers all areas, technical fields and industrial applications in which these hygiene measures, provisions and procedures are important, for example with regard to hygiene in kitchens, bakeries, airports, bathrooms, swimming pools, department stores, hotels, hospitals, stables, animal keeping, etc.

The term "hygiene pest" should therefore be understood to mean one or more animal pests whose presence in the hygiene sector is problematic, especially for reasons of health. A main aim is therefore that of avoiding, or limiting to a minimum degree, the presence of hygiene pests and/or the exposure to these in the hygiene sector. This can especially be achieved through the use of a pesticide which can be used both

for prevention of infestation and for prevention of an existing infestation. It is also possible to use formulations which prevent or reduce exposure to pests. Hygiene pests include, for example, the organisms mentioned below.

The term "hygiene protection" thus covers all acts by which these hygiene measures, provisions and procedures are maintained and/or improved.

The compounds of the formula (I) can preferably be used as pesticides. They are active against normally sensitive and resistant species and also against all or specific stages of development. The abovementioned pests include:

pests from the phylum of the Arthropoda, in particular from the class of the Arachnida, for example Acarus spp., Acarus spp., e.g. Acarus siro, Aceria kuko, Aceria sheldoni, Aculops spp., Aculus spp., e.g. Aculus fockeui, Aculus schlechtendali, Amblyomma spp., Amphitetranychus viennensis, Argas spp., Boophilus spp., Brevipalpus spp., e.g. Brevipalpus phoenicis, Bryobia graminum, Bryobia praetiosa, Centruroides spp., Chorioptes spp., Dermanyssus gallinae, Dermatophagoides pteronyssinus, Dermatophagoides farinae, Dermacentor spp., Eotetranychus spp., e.g. Eotetranychus hicoriae, Epitrimerus pyri, Eutetranychus spp., e.g. Eutetranychus banksi, Eriophyes spp., e.g. Eriophyes pyri, Glycyphagus domesticus, Halotydeus destructor, Hemitarsonemus spp., e.g. Hemitarsonemus latus (=Polyphagotarsonemus latus), Hyalomma spp., Ixodes spp., Latrodectus spp., Loxosceles spp., Neutrombicula autumnalis, Nuphersa spp., Oligonychus spp., e.g. Oligonychus coffeae, Oligonychus coniferarum, Oligonychus ilicis, Oligonychus indicus, Oligonychus mangiferus, Oligonychus pratensis, Oligonychus punicae, Oligonychus yothersi, Ornithodorus spp., Ornithonyssus spp., Panonychus spp., e.g. Panonychus citri (=Metatetranychus citri), Panonychus ulmi (=Metatetranychus ulmi), Phyllocoptruta oleivora, Platytetranychus multidigituli, Polyphagotarsonemus latus, Psoroptes spp., Rhipicephalus spp., Rhizoglyphus spp., Sarcoptes spp., Scorpio maurus, Steneotarsonemus spp., Steneotarsonemus spinki, Tarsonemus spp., e.g. Tarsonemus confusus, Tarsonemus pallidus, Tetranychus spp., e.g. Tetranychus canadensis, Tetranychus cinnabarinus, Tetranychus turkestani, Tetranychus urticae, Trombicula alfreddugesi, Vaejovis spp., Vasates lycopersici;

from the class of the Chilopoda, for example Geophilus spp., Scutigera spp.;

from the order or the class of the Collembola, for example Onychiurus armatus; Sminthurus viridis;

from the class of the Diplopoda, for example Blaniulus guttulatus;

from the class of the Insecta, for example from the order of the Blattodea, e.g. Blatta orientalis, Blattella asahinai, Blattella germanica, Leucophaea maderae, Loboptera decipiens, Neostylopyga rhombifolia, Panchlora spp., Parcoblatta spp., Periplaneta spp., e.g. Periplaneta americana, Periplaneta australasiae, Pycnoscelus surinamensis, Supella longipalpa;

from the order of the Coleoptera, for example Acalymma vittatum, Acanthoscelides obtectus, Adoretus spp., Aethina tumida, Agelastica alni, Agrilus spp., e.g. Agrilus planipennis, Agrilus coxalis, Agrilus bilineatus, Agrilus anxius, Agriotes spp., e.g. Agriotes linneatus, Agriotes mancus, Alphitobius diaperinus, Amphimallon solstitialis, Anobium punctatum, Anoplophora spp., e.g. Anoplophora glabripennis, Anthonomus spp., e.g. Anthonomus grandis, Anthrenus spp., Apion spp., Apogonia spp., Atomaria spp., e.g. Atomaria linearis, Attagenus spp., Baris caerulescens, Bruchidius obtectus, Bruchus spp., e.g. Bruchus pisorum, Bruchus rufimanus, Cassida spp., Cerotoma trifurcata, Ceutorrhynchus spp., e.g. Ceutorrhynchus assimilis, Ceutorrhynchus quadridens, Ceutorrhynchus rapae, Chaetocnema spp., e.g. Chaetocnema confinis, Chaetocnema denticulata, Chaetocnema ectypa, Cleonus mendicus, Conoderus spp., Cosmopolites spp., e.g. Cosmopolites sordidus, Costelytra zealandica, Ctenicera spp., Curculio spp., e.g. Curculio caryae, Curculio caryatrypes, Curculio obtusus, Curculio sayi, Cryptolestes ferrugineus, Cryptolestes pusillus, Cryptorhynchus lapathi, Cryptorhynchus mangiferae, Cylindrocopturus spp., Cylindrocopturus adspersus, Cylindrocopturus furnissi, Dendroctonus spp., e.g. Dendroctonus ponderosae, Dermestes spp., Diabrotica spp., e.g. Diabrotica balteata, Diabrotica barberi, Diabrotica undecimpunctata howardi, Diabrotica undecimpunctata undecimpunctata, Diabrotica virgifera virgifera, Diabrotica virgifera zeae, Dichocrocis spp., Dicladispa armigera, Diloboderus spp., Epicaerus spp., Epilachna spp., e.g. Epilachna borealis, Epilachna varivestis, Epitrix spp., e.g. Epitrix cucumeris, Epitrix fuscula, Epitrix hirtipennis, Epitrix subcrinita, Epitrix tuberis, Faustinus spp., Gibbium psylloides, Gnathocerus cornutus, Hellula undalis, Heteronychus arator, Heteronyx spp., Hylamorpha elegans, Hylotrupes bajulus, Hypera postica, Hypomeces squamosus, Hypothenemus spp., e.g. Hypothenemus hampei, Hypothenemus obscurus, Hypothenemus pubescens, Lachnosterna consanguinea, Lasioderma serricorne, Latheticus oryzae, Lathridius spp., Lema spp., Leptinotarsa decemlineata, Leucoptera spp., e.g. Leucoptera coffeella, Lissorhoptrus oryzophilus, Listronotus (=Hyperodes) spp., Lixus spp., Luperodes spp., Luperomorpha xanthodera, Lyctus spp., Megacyllene spp., e.g. Megacyllene robiniae, Megascelis spp., Melanotus spp., e.g. Melanotus longulus oregonensis, Meligethes aeneus, Melolontha spp., e.g. Melolontha melolontha, Migdolus spp., Monochamus spp., Naupactus xanthographus, Necrobia spp., Neogalerucella spp., Niptus hololeucus, Oryctes rhinoceros, Oryzaephilus surinamensis, Oryzaphagus oryzae, Otiorhynchus spp., e.g. Otiorhynchus cribricollis, Otiorhynchus ligustici, Otiorhynchus ovatus, Otiorhynchus rugosostriarus, Otiorhynchus sulcatus, Oulema spp., e.g. Oulema melanopus, Oulema oryzae, Oxycetonia jucunda, Phaedon cochleariae, Phyllophaga spp., Phyllophaga helleri, Phyllotreta spp., e.g. Phyllotreta armoraciae, Phyllotreta pusilla, Phyllotreta ramosa, Phyllotreta striolata, Popillia japonica, Premnotrypes spp., Prostephanus truncatus, Psylliodes spp., e.g. Psylliodes affinis, Psylliodes chrysocephala, Psylliodes punctulata, Ptinus spp., Rhizobius ventralis, Rhizopertha dominica, Rhynchophorus spp., Rhynchophorus ferrugineus, Rhynchophorus palmarum, Scolytus spp., e.g. Scolytus multistriatus, Sinoxylon perforans, Sitophilus spp., e.g. Sitophilus granarius, Sitophilus linearis, Sitophilus oryzae, Sitophilus zeamais, Sphenophorus spp., Stegobium paniceum, Sternechus spp., e.g. Sternechus paludatus, Symphyletes spp., Tanymecus spp., e.g. Tanymecus dilaticollis, Tanymecus indicus, Tanymecus palliatus, Tenebrio molitor, Tenebrioides mauretanicus, Tribolium spp., e.g. Tribolium audax,

Tribolium castaneum, Tribolium confusum, Trogoderma spp., Tychius spp., Xylotrechus spp., Zabrus spp., e.g. Zabrus tenebrioides;

from the order of the Dermaptera, for example Anisolabis maritime, Forficula auricularia, Labidura riparia;

from the order of the Diptera, for example Aedes spp., e.g. Aedes aegypti, Aedes albopictus, Aedes sticticus, Aedes vexans, Agromyza spp., e.g. Agromyza frontella, Agromyza parvicornis, Anastrepha spp., Anopheles spp., e.g. Anopheles quadrimaculatus, Anopheles gambiae, Asphondylia spp., Bactrocera spp., e.g. Bactrocera cucurbitae, Bactrocera dorsalis, Bactrocera oleae, Bibio hortulanus, Calliphora erythrocephala, Calliphora vicina, Ceratitis capitata, Chironomus spp., Chrysomya spp., Chrysops spp., Chrysozona pluvialis, Cochliomya spp., Contarinia spp., e.g. Contarinia johnsoni, Contarinia nasturtii, Contarinia pyrivora, Contarinia schulzi, Contarinia sorghicola, Contarinia tritici, Cordylobia anthropophaga, Cricotopus sylvestris, Culex spp., e.g. Culex pipiens, Culex quinquefasciatus, Culicoides spp., Culiseta spp., Cuterebra spp., Dacus oleae, Dasineura spp., e.g. Dasineura brassicae, Delia spp., e.g. Delia antiqua, Delia coarctata, Delia florilega, Delia platura, Delia radicum, Dermatobia hominis, Drosophila spp., e.g. Drosphila melanogaster, Drosophila suzukii, Echinocnemus spp., Euleia heraclei, Fannia spp., Gasterophilus spp., Glossina spp., Haematopota spp., Hydrellia spp., Hydrellia griseola, Hylemya spp., Hippobosca spp., Hypoderma spp., Liriomyza spp., e.g. Liriomyza brassicae, Liriomyza huidobrensis, Liriomyza sativae, Lucilia spp., e.g. Lucilia cuprina, Lutzomyia spp., Mansonia spp., Musca spp., e.g. Musca domestica, Musca domestica vicina, Oestrus spp., Oscinella frit, Paratanytarsus spp., Paralauterborniella subcincta, Pegomya oder Pegomyia spp., e.g. Pegomya betae, Pegomya hyoscyami, Pegomya rubivora, Phlebotomus spp., Phorbia spp., Phormia spp., Piophila casei, Platyparea poeciloptera, Prodiplosis spp., Psila rosae, Rhagoletis spp., e.g. Rhagoletis cingulata, Rhagoletis completa, Rhagoletis fausta, Rhagoletis indifferens, Rhagoletis mendax, Rhagoletis pomonella, Sarcophaga spp., Simulium spp., e.g. Simulium meridionale, Stomoxys spp., Tabanus spp., Tetanops spp., Tipula spp., e.g. Tipula paludosa, Tipula simplex, Toxotrypana curvicauda;

from the order of the Hemiptera, for example Acizzia acaciaebaileyanae, Acizzia dodonaeae, Acizzia uncatoides, Acrida turrita, Acyrthosipon spp., e.g. Acyrthosiphon pisum, Acrogonia spp., Aeneolamia spp., Agonoscena spp., Aleurocanthus spp., Aleyrodes proletella, Aleurolobus barodensis, Aleurothrixus floccosus, Allocaridara malayensis, Amrasca spp., e.g. Amrasca bigutulla, Amrasca devastans, Anuraphis cardui, Aonidiella spp., e.g. Aonidiella aurantii, Aonidiella citrina, Aonidiella inornata, Aphanostigma piri, Aphis spp., e.g. Aphis citricola, Aphis craccivora, Aphis fabae, Aphis forbesi, Aphis glycines, Aphis gossypii, Aphis hederae, Aphis illinoisensis, Aphis middletoni, Aphis nasturtii, Aphis nerii, Aphis pomi, Aphis spiraecola, Aphis viburniphila, Arboridia apicalis, Arytainilla spp., Aspidiella spp., Aspidiotus spp., e.g. Aspidiotus nerii, Atanus spp., Aulacorthum solani, Bemisia tabaci, Blastopsylla occidentalis, Boreioglycaspis melaleucae, Brachycaudus helichrysi, Brachycolus spp., Brevicoryne brassicae, Cacopsylla spp., e.g. Cacopsylla pyricola, Calligypona marginata, Capulinia spp., Carneocephala fulgida,

Ceratovacuna lanigera, Cercopidae, Ceroplastes spp., Chaetosiphon fragaefolii, Chionaspis tegalensis, Chlorita onukii, Chondracris rosea, Chromaphis juglandicola, Chrysomphalus aonidum, Chrysomphalus ficus, Cicadulina mbila, Coccomytilus halli, Coccus spp., e.g. Coccus hesperidum, Coccus longulus, Coccus pseudomagnoliarum, Coccus viridis, Cryptomyzus ribis, Cryptoneossa spp., Ctenarytaina spp., Dalbulus spp., Dialeurodes chittendeni, Dialeurodes citri, Diaphorina citri, Diaspis spp., Diuraphis spp., Doralis spp., Drosicha spp., Dysaphis spp., e.g. Dysaphis apiifolia, Dysaphis plantaginea, Dysaphis tulipae, Dysmicoccus spp., Empoasca spp., e.g. Empoasca abrupta, Empoasca fabae, Empoasca maligna, Empoasca solana, Empoasca stevensi, Eriosoma spp., e.g. Eriosoma americanum, Eriosoma lanigerum, Eriosoma pyricola, Erythroneura spp., Eucalyptolyma spp., Euphyllura spp., Euscelis bilobatus, Ferrisia spp., Fiorinia spp., Furcaspis oceanica, Geococcus coffeae, Glycaspis spp., Heteropsylla cubana, Heteropsylla spinulosa, Homalodisca coagulata, Hyalopterus arundinis, Hyalopterus pruni, Icerya spp., e.g. Icerya purchasi, Idiocerus spp., Idioscopus spp., Laodelphax striatellus, Lecanium spp., e.g. Lecanium corni (=Parthenolecanium corni), Lepidosaphes spp., e.g. Lepidosaphes ulmi, Lipaphis erysimi, Lopholeucaspis japonica, Lycorma delicatula, Macrosiphum spp., e.g. Macrosiphum euphorbiae, Macrosiphum lilii, Macrosiphum rosae, Macrosteles facifrons, Mahanarva spp., Melanaphis sacchari, Metcalfiella spp., Metcalfa pruinosa, Metopolophium dirhodum, Monellia costalis, Monelliopsis pecanis, Myzus spp., e.g. Myzus ascalonicus, Myzus cerasi, Myzus ligustri, Myzus ornatus, Myzus persicae, Myzus nicotianae, Nasonovia ribisnigri, Neomaskellia spp., Nephotettix spp., e.g. Nephotettix cincticeps, Nephotettix nigropictus, Nettigoniclla spectra, Nilaparvata lugens, Oncometopia spp., Orthezia praelonga, Oxya chinensis, Pachypsylla spp., Parabemisia myricae, Paratrioza spp., e.g. Paratrioza cockerelli, Parlatoria spp., Pemphigus spp., e.g. Pemphigus bursarius, Pemphigus populivenae, Peregrinus maidis, Perkinsiella spp., Phenacoccus spp., e.g. Phenacoccus madeirensis, Phloeomyzus passerinii, Phorodon humuli, Phylloxera spp., e.g. Phylloxera devastatrix, Phylloxera notabilis, Pinnaspis aspidistrae, Planococcus spp., e.g. Planococcus citri, Prosopidopsylla flava, Protopulvinaria pyriformis, Pseudaulacaspis pentagona, Pseudococcus spp., e.g. Pseudococcus calceolariae, Pseudococcus comstocki, Pseudococcus longispinus, Pseudococcus maritimus, Pseudococcus viburni, Psyllopsis spp., Psylla spp., e.g. Psylla buxi, Psylla mali, Psylla pyri, Pteromalus spp., Pulvinaria spp., Pyrilla spp., Quadraspidiotus spp., e.g. Quadraspidiotus juglansregiae, Quadraspidiotus ostreaeformis, Quadraspidiotus perniciosus, Quesada gigas, Rastrococcus spp., Rhopalosiphum spp., e.g. Rhopalosiphum maidis, Rhopalosiphum oxyacanthae, Rhopalosiphum padi, Rhopalosiphum rufiabdominale, Saissetia spp., e.g. Saissetia coffeae, Saissetia miranda, Saissetia neglecta, Saissetia oleae, Scaphoideus titanus, Schizaphis graminum, Selenaspidus articulatus, Sipha flava, Sitobion avenae, Sogata spp., Sogatella furcifera, Sogatodes spp., Stictocephala festina, Siphoninus phillyreae, Tenalaphara malayensis, Tetragonocephela spp., Tinocallis caryaefoliae, Tomaspis spp., Toxoptera spp., e.g. Toxoptera aurantii, Toxoptera citricidus, Trialeurodes vaporariorum, Trioza spp., e.g. Trioza diospyri, Typhlocyba spp., Unaspis spp., Viteus vitifolii, Zygina spp.;

from the suborder of the Heteroptera, for example Aelia spp., Anasa tristis, Antestiopsis spp., Boisea spp., Blissus spp., Calocoris spp., Campylomma livida, Cavelerius spp., Cimex spp., e.g. Cimex adjunctus,

Cimex hemipterus, Cimex lectularius, Cimex pilosellus, Collaria spp., Creontiades dilutus, Dasynus piperis, Dichelops furcatus, Diconocoris hewetti, Dysdercus spp., Euschistus spp., e.g. Euschistus heros, Euschistus servus, Euschistus tristigmus, Euschistus variolarius, Eurydema spp., Eurygaster spp., Halyomorpha halys, Heliopeltis spp., Horcias nobilellus, Leptocorisa spp., Leptocorisa varicornis, Leptoglossus occidentalis, Leptoglossus phyllopus, Lygocoris spp., e.g. Lygocoris pabulinus, Lygus spp., e.g. Lygus elisus, Lygus hesperus, Lygus lineolaris, Macropes excavatus, Megacopta cribraria, Miridae, Monalonion atratum, Nezara spp., e.g. Nezara viridula, Nysius spp., Oebalus spp., Pentomidae, Piesma quadrata, Piezodorus spp., e.g. Piezodorus guildinii, Psallus spp., Pseudacysta persea, Rhodnius spp., Sahlbergella singularis, Scaptocoris castanea, Scotinophora spp., Stephanitis nashi, Tibraca spp., Triatoma spp.;

from the order of the Hymenoptera, for example Acromyrmex spp., Athalia spp., e.g. Athalia rosae, Atta spp., Camponotus spp., Dolichovespula spp., Diprion spp., e.g. Diprion similis, Hoplocampa spp., e.g. Hoplocampa cookei, Hoplocampa testudinea, Lasius spp., Linepithema (Iridiomyrmex) humile, Monomorium pharaonis, Paratrechina spp., Paravespula spp., Plagiolepis spp., Sirex spp., e.g. Sirex noctilio, Solenopsis invicta, Tapinoma spp., Technomyrmex albipes, Urocerus spp., Vespa spp., e.g. Vespa crabro, Wasmannia auropunctata, Xeris spp.;

from the order of the Isopoda, for example Armadillidium vulgare, Oniscus asellus, Porcellio scaber;

from the order of the Isoptera, for example Coptotermes spp., e.g. Coptotermes formosanus, Cornitermes cumulans, Cryptotermes spp., Incisitermes spp., Kalotermes spp., Microtermes obesi, Nasutitermis spp., Odontotermes spp., Porotermes spp., Reticulitermes spp., e.g. Reticulitermes flavipes, Reticulitermes hesperus;

from the order of the Lepidoptera, for example Achroia grisella, Acronicta major, Adoxophyes spp., e.g. Adoxophyes orana, Aedia leucomelas, Agrotis spp., e.g. Agrotis segetum, Agrotis ipsilon, Alabama spp., e.g. Alabama argillacea, Amyelois transitella, Anarsia spp., Anticarsia spp., e.g. Anticarsia gemmatalis, Argyroploce spp., Autographa spp., Barathra brassicae, Blastodacna atra, Borbo cinnara, Bucculatrix thurberiella, Bupalus piniarius, Busseola spp., Cacoecia spp., Caloptilia theivora, Capua reticulana, Carpocapsa pomonella, Carposina niponensis, Cheimatobia brumata, Chilo spp., e.g. Chilo plejadellus, Chilo suppressalis, Choreutis pariana, Choristoneura spp., Chrysodeixis chalcites, Clysia ambiguella, Cnaphalocerus spp., Cnaphalocrocis medinalis, Cnephasia spp., Conopomorpha spp., Conotrachelus spp., Copitarsia spp., Cydia spp., e.g. Cydia nigricana, Cydia pomonella, Dalaca noctuides, Diaphania spp., Diparopsis spp., Diatraea saccharalis, Dioryctria spp., e.g. Dioryctria zimmermani, Earias spp., Ecdytolopha aurantium, Elasmopalpus lignosellus, Eldana saccharina, Ephestia spp., e.g. Ephestia elutella, Ephestia kuehniella, Epinotia spp., Epiphyas postvittana, Erannis spp., Erschoviella musculana, Etiella spp., Eudocima spp., Eulia spp., Eupoecilia ambiguella, Euproctis spp., e.g. Euproctis chrysorrhoea, Euxoa spp., Feltia spp., Galleria mellonella, Gracillaria spp., Grapholitha spp., e.g. Grapholita molesta, Grapholita prunivora, Hedylepta spp., Helicoverpa spp., e.g. Helicoverpa armigera,

Helicoverpa zea, Heliothis spp., e.g. Heliothis virescens , Hofmannophila pseudospretella, Homoeosoma spp., Homona spp., Hyponomeuta padella, Kakivoria flavofasciata, Lampides spp., Laphygma spp., Laspeyresia molesta, Leucinodes orbonalis, Leucoptera spp., e.g. Leucoptera coffeella, Lithocolletis spp., e.g. Lithocolletis blancardella, Lithophane antennata, Lobesia spp., e.g. Lobesia botrana, Loxagrotis albicosta, Lymantria spp., e.g. Lymantria dispar, Lyonetia spp., e.g. Lyonetia clerkella, Malacosoma neustria, Maruca testulalis, Mamestra brassicae, Melanitis leda, Mocis spp., Monopis obviella, Mythimna separata, Nemapogon cloacellus, Nymphula spp., Oiketicus spp., Omphisa spp., Operophtera spp., Oria spp., Orthaga spp., Ostrinia spp., e.g. Ostrinia nubilalis, Panolis flammea, Parnara spp., Pectinophora spp., e.g. Pectinophora gossypiella, Perileucoptera spp., Phthorimaea spp., e.g. Phthorimaea operculella, Phyllocnistis citrella, Phyllonorycter spp., e.g. Phyllonorycter blancardella, Phyllonorycter crataegella, Pieris spp., e.g. Pieris rapae, Platynota stultana, Plodia interpunctella, Plusia spp., Plutella xylostella (=Plutella maculipennis), Podesia spp., e.g. Podesia syringae, Prays spp., Prodenia spp., Protoparce spp., Pseudaletia spp., e.g. Pseudaletia unipuncta, Pseudoplusia includens, Pyrausta nubilalis, Rachiplusia nu, Schoenobius spp., e.g. Schoenobius bipunctifer, Scirpophaga spp., e.g. Scirpophaga innotata, Scotia segetum, Sesamia spp., e.g. Sesamia inferens, Sparganothis spp., Spodoptera spp., e.g. Spodoptera eradiana, Spodoptera exigua, Spodoptera frugiperda, Spodoptera praefica, Stathmopoda spp., Stenoma spp., Stomopteryx subsecivella, Synanthedon spp., Tecia solanivora, Thaumetopoea spp., Thermesia gemmatalis, Tinea cloacella, Tinea pellionella, Tineola bisselliella, Tortrix spp., Trichophaga tapetzella, Trichoplusia spp., e.g. Trichoplusia ni, Tryporyza incertulas, Tuta absoluta, Virachola spp.;

from the order of the Orthoptera or Saltatoria, for example Acheta domesticus, Dichroplus spp., Gryllotalpa spp., e.g. Gryllotalpa gryllotalpa, Hieroglyphus spp., Locusta spp., e.g. Locusta migratoria, Melanoplus spp., e.g. Melanoplus devastator, Paratlanticus ussuriensis, Schistocerca gregaria;

from the order of the Phthiraptera, for example Damalinia spp., Haematopinus spp., Linognathus spp., Pediculus spp., Phylloxera vastatrix, Phthirus pubis, Trichodectes spp.;

from the order of the Psocoptera, for example Lepinotus spp., Liposcelis spp.;

from the order of the Siphonaptera, for example Ceratophyllus spp., Ctenocephalides spp., e.g. Ctenocephalides canis, Ctenocephalides felis, Pulex irritans, Tunga penetrans, Xenopsylla cheopis;

from the order of the Thysanoptera, for example Anaphothrips obscurus, Baliothrips biformis, Chaetanaphothrips leeuweni, Drepanothrips reuteri, Enneothrips flavens, Frankliniella spp., e.g. Frankliniella fusca, Frankliniella occidentalis, Frankliniella schultzei, Frankliniella tritici, Frankliniella vaccinii, Frankliniella williamsi, Haplothrips spp., Heliothrips spp., Hercinothrips femoralis, Kakothrips spp., Rhipiphorothrips cruentatus, Scirtothrips spp., Taeniothrips cardamomi, Thrips spp., e.g. Thrips palmi, Thrips tabaci;

from the order of the Zygentoma (= Thysanura), e.g. Ctenolepisma spp., Lepisma saccharina, Lepismodes inquilinus, Thermobia domestica;

from the class of the Symphyla, for example Scutigerella spp., e.g. Scutigerella immaculata;

pests from the phylum of the Mollusca, for example from the class of the Bivalvia, e.g. Dreissena spp.;

and from the class of the Gastropoda, for example Arion spp., e.g. Arion ater rufus, Biomphalaria spp., Bulinus spp., Deroceras spp., e.g. Deroceras laeve, Galba spp., Lymnaea spp., Oncomelania spp., Pomacea spp., Succinea spp.;

plant pests from the phylum of the Nematoda, i.e. phytoparasitic nematodes, in particular Aglenchus spp., e.g. Aglenchus agricola, Anguina spp., e.g. Anguina tritici, Aphelenchoides spp., e.g. Aphelenchoides arachidis, Aphelenchoides fragariae, Belonolaimus spp., e.g. Belonolaimus gracilis, Belonolaimus longicaudatus, Belonolaimus nortoni, Bursaphelenchus spp., e.g. Bursaphelenchus cocophilus, Bursaphelenchus eremus, Bursaphelenchus xylophilus, Cacopaurus spp., e.g. Cacopaurus pestis, Criconemella spp., e.g. Criconemella curvata, Criconemella onoensis, Criconemella ornata, Criconemella rusium, Criconemella xenoplax (= Mesocriconema xenoplax), Criconemoides spp., e.g. Criconemoides ferniae, Criconemoides onoense, Criconemoides ornatum, Ditylenchus spp., e.g. Ditylenchus dipsaci, Dolichodorus spp., Globodera spp., e.g. Globodera pallida, Globodera rostochiensis, Helicotylenchus spp., e.g. Helicotylenchus dihystera, Hemicriconemoides spp., Hemicycliophora spp., Heterodera spp., e.g. Heterodera avenae, Heterodera glycines, Heterodera schachtii, Hirschmaniella spp., Hoplolaimus spp., Longidorus spp., e.g. Longidorus africanus, Meloidogyne spp., e.g. Meloidogyne chitwoodi, Meloidogyne fallax, Meloidogyne hapla, Meloidogyne incognita, Meloinema spp., Nacobbus spp., Neotylenchus spp., Paralongidorus spp., Paraphelenchus spp., Paratrichodorus spp., e.g. Paratrichodorus minor, Paratylenchus spp., Pratylenchus spp., e.g. Pratylenchus penetrans, Pseudohalenchus spp., Psilenchus spp., Punctodera spp., Quinisulcius spp., Radopholus spp., e.g. Radopholus citrophilus, Radopholus similis, Rotylenchulus spp., Rotylenchus spp., Scutellonema spp., Subanguina spp., Trichodorus spp., e.g. Trichodorus obtusus, Trichodorus primitivus, Tylenchorhynchus spp., e.g. Tylenchorhynchus annulatus, Tylenchulus spp., e.g. Tylenchulus semipenetrans, Xiphinema spp., e.g. Xiphinema index.

The compounds of the formula (I) can, as the case may be, at certain concentrations or application rates, also be used as herbicides, safeners, growth regulators or agents to improve plant properties, as microbicides or gametocides, for example as fungicides, antimycotics, bactericides, virucides (including agents against viroids) or as agents against MLO (mycoplasma-like organisms) and RLO (rickettsia-like organisms). They can, as the case may be, also be used as intermediates or precursors for the synthesis of other active compounds.

Formulations

The present invention further relates to formulations and use forms prepared therefrom as pesticides, for example drench, drip and spray liquors, comprising at least one compound of the formula (I). Optionally,

the use forms comprise further pesticides and/or adjuvants which improve action, such as penetrants, e.g. vegetable oils, for example rapeseed oil, sunflower oil, mineral oils, for example paraffin oils, alkyl esters of vegetable fatty acids, for example rapeseed oil methyl ester or soya oil methyl ester, or alkanol alkoxylates and/or spreaders, for example alkylsiloxanes and/or salts, for example organic or inorganic ammonium or phosphonium salts, for example ammonium sulfate or diammonium hydrogenphosphate and/or retention promoters, for example dioctyl sulfosuccinate or hydroxypropylguar polymers and/or humectants, for example glycerol and/or fertilizers, for example ammonium-, potassium- or phosphorus-containing fertilizers.

Customary formulations are, for example, water-soluble liquids (SL), emulsion concentrates (EC), emulsions in water (EW), suspension concentrates (SC, SE, FS, OD), water-dispersible granules (WG), granules (GR) and capsule concentrates (CS); these and further possible formulation types are described, for example, by Crop Life International and in Pesticide Specifications, Manual on development and use of FAO and WHO specifications for pesticides, FAO Plant Production and Protection Papers – 173, prepared by the FAO/WHO Joint Meeting on Pesticide Specifications, 2004, ISBN: 9251048576. The formulations, in addition to one or more compounds of the formula (I), optionally comprise further active agrochemical ingredients.

Preference is given to formulations or use forms comprising auxiliaries, for example extenders, solvents, spontaneity promoters, carriers, emulsifiers, dispersants, frost protection agents, biocides, thickeners and/or further auxiliaries, for example adjuvants. An adjuvant in this context is a component which enhances the biological effect of the formulation, without the component itself having any biological effect. Examples of adjuvants are agents which promote retention, spreading, attachment to the leaf surface or penetration.

These formulations are produced in a known manner, for example by mixing the compounds of the formula (I) with auxiliaries, for example extenders, solvents and/or solid carriers and/or other auxiliaries, for example surfactants. The formulations are produced either in suitable facilities or else before or during application.

The auxiliaries used may be substances suitable for imparting special properties, such as certain physical, technical and/or biological properties, to the formulation of the compounds of the formula (I), or to the use forms prepared from these formulations (for example ready-to-use pesticides such as spray liquors or seed-dressing products).

Suitable extenders are, for example, water, polar and nonpolar organic chemical liquids, for example from the classes of the aromatic and non-aromatic hydrocarbons (such as paraffins, alkylbenzenes, alkylnaphthalenes, chlorobenzenes), the alcohols and polyols (which, if appropriate, may also be substituted, etherified and/or esterified), the ketones (such as acetone, cyclohexanone), esters (including

fats and oils) and (poly)ethers, the simple and substituted amines, amides, lactams (such as N-alkylpyrrolidones) and lactones, the sulfones and sulfoxides (such as dimethyl sulfoxide).

If the extender used is water, it is also possible to use, for example, organic solvents as auxiliary solvents. Useful liquid solvents are essentially: aromatics such as xylene, toluene or alkylnaphthalenes, chlorinated aromatics or chlorinated aliphatic hydrocarbons such as chlorobenzenes, chloroethylenes or methylene chloride, aliphatic hydrocarbons such as cyclohexane or paraffins, for example petroleum fractions, mineral and vegetable oils, alcohols such as butanol or glycol and their ethers and esters, ketones such as acetone, methyl ethyl ketone, methyl isobutyl ketone or cyclohexanone, strongly polar solvents such as dimethylformamide and dimethyl sulfoxide, and also water.

In principle, it is possible to use all suitable solvents. Examples of suitable solvents are aromatic hydrocarbons, for example xylene, toluene or alkylnaphthalenes, chlorinated aromatic or chlorinated aliphatic hydrocarbons, for example chlorobenzene, chloroethylene or methylene chloride, aliphatic hydrocarbons, for example cyclohexane, paraffins, petroleum fractions, mineral and vegetable oils, alcohols, for example methanol, ethanol, isopropanol, butanol or glycol and their ethers and esters, ketones, for example acetone, methyl ethyl ketone, methyl isobutyl ketone or cyclohexanone, strongly polar solvents, for example dimethyl sulfoxide, and water.

In principle, it is possible to use all suitable carriers. Suitable carriers include more particularly the following: e.g. ammonium salts and natural, finely ground rocks, such as kaolins, aluminas, talc, chalk, quartz, attapulgite, montmorillonite or diatomaceous earth, and synthetic, finely ground rocks, such as highly disperse silica, aluminium oxide and natural or synthetic silicates, resins, waxes and/or solid fertilizers. It is likewise possible to use mixtures of such carriers. Useful carriers for granules include: for example crushed and fractionated natural rocks such as calcite, marble, pumice, sepiolite, dolomite, and synthetic granules of inorganic and organic flours, and also granules of organic material such as sawdust, paper, coconut shells, maize cobs and tobacco stalks.

It is also possible to use liquefied gaseous extenders or solvents. Especially suitable extenders or carriers are those which are gaseous at standard temperature and under atmospheric pressure, for example aerosol propellants such as halogenated hydrocarbons, and also butane, propane, nitrogen and carbon dioxide.

Examples of emulsifiers and/or foam formers, dispersants or wetting agents having ionic or nonionic properties or mixtures of these surface-active substances are salts of polyacrylic acid, salts of lignosulfonic acid, salts of phenolsulfonic acid or naphthalenesulfonic acid, polycondensates of ethylene oxide with fatty alcohols or with fatty acids or with fatty amines, with substituted phenols (preferably alkylphenols or arylphenols), salts of sulfosuccinic esters, taurine derivatives (preferably alkyl taurates), phosphoric esters of polyethoxylated alcohols or phenols, fatty acid esters of polyols, and derivatives of the compounds containing sulfates, sulfonates and phosphates, for example alkylaryl polyglycol ethers, alkylsulfonates, alkyl sulfates, arylsulfonates, protein hydrolysates, lignosulfite waste liquors and

methylcellulose. The presence of a surfactant is advantageous if one of the compounds of the formula (I) and/or one of the inert carriers is insoluble in water and if the application takes place in water.

Further auxiliaries which may be present in the formulations and the use forms derived therefrom include dyes such as inorganic pigments, for example iron oxide, titanium oxide and Prussian Blue, and organic dyes such as alizarin dyes, azo dyes and metal phthalocyanine dyes, and nutrients and trace nutrients such as salts of iron, manganese, boron, copper, cobalt, molybdenum and zinc.

Additional components which may be present are stabilizers, such as cold stabilizers, preservatives, antioxidants, light stabilizers, or other agents which improve chemical and/or physical stability. Foam generators or antifoams may also be present.

In addition, the formulations and the use forms derived therefrom may also comprise, as additional auxiliaries, stickers such as carboxymethylcellulose and natural and synthetic polymers in the form of powders, granules or latices, such as gum arabic, polyvinyl alcohol and polyvinyl acetate, or else natural phospholipids such as cephalins and lecithins and synthetic phospholipids. Further auxiliaries may be mineral and vegetable oils.

It is possible if appropriate for still further auxiliaries to be present in the formulations and the use forms derived therefrom. Examples of such additives are fragrances, protective colloids, binders, adhesives, thickeners, thixotropic agents, penetrants, retention promoters, stabilizers, sequestrants, complexing agents, humectants, spreaders. In general, the compounds of the formula (I) can be combined with any solid or liquid additive commonly used for formulation purposes.

Useful retention promoters include all those substances which reduce dynamic surface tension, for example dioctyl sulfosuccinate, or increase viscoelasticity, for example hydroxypropylguar polymers.

Useful penetrants in the present context are all those substances which are typically used to improve the penetration of active agrochemical ingredients into plants. Penetrants are defined in this context by their ability to penetrate from the (generally aqueous) application liquor and/or from the spray coating into the cuticle of the plant and hence to increase the mobility of the active compounds in the cuticle. The method described in the literature (Baur et al., 1997, Pesticide Science 51, 131-152) can be used for determining this property. Examples include alcohol alkoxylates such as coconut fatty ethoxylate (10) or isotridecyl ethoxylate (12), fatty acid esters, for example rapeseed oil methyl ester or soya oil methyl ester, fatty amine alkoxylates, for example tallowamine ethoxylate (15), or ammonium and/or phosphonium salts, for example ammonium sulfate or diammonium hydrogenphosphate.

The formulations preferably comprise between 0.00000001% and 98% by weight of the compound of the formula (I), more preferably between 0.01% and 95% by weight of the compound of the formula (I), most

preferably between 0.5% and 90% by weight of the compound of the formula (I), based on the weight of the formulation.

The content of the compound of the formula (I) in the use forms prepared from the formulations (in particular pesticides) may vary within wide ranges. The concentration of the compound of the formula (I) in the use forms may typically be between 0.00000001% and 95% by weight of the compound of the formula (I), preferably between 0.00001% and 1% by weight, based on the weight of the use form. Application is accomplished in a customary manner appropriate for the use forms.

Mixtures

The compounds of the formula (I) can also be used in a mixture with one or more suitable fungicides, bactericides, acaricides, molluscicides, nematicides, insecticides, microbiological agents, beneficial organisms, herbicides, fertilizers, bird repellents, phytotonics, sterilants, safeners, semiochemicals and/or plant growth regulators, in order thus, for example, to broaden the spectrum of action, prolong the period of action, enhance the rate of action, prevent repellency or prevent evolution of resistance. In addition, active compound combinations of this kind can improve plant growth and/or tolerance to abiotic factors, for example high or low temperatures, to drought or to elevated water content or soil salinity. It is also possible to improve flowering and fruiting performance, optimize germination capacity and root development, facilitate harvesting and improve yields, influence maturation, improve the quality and/or the nutritional value of the harvested products, prolong storage life and/or improve the processibility of the harvested products.

In addition, the compounds of the formula (I) may be present in a mixture with other active compounds or semiochemicals such as attractants and/or bird repellents and/or plant activators and/or growth regulators and/or fertilizers. Likewise, the compounds of the formula (I) can be used to improve plant properties, for example growth, yield and quality of the harvested material.

In a particular embodiment according to the invention, the compounds of the formula (I) are present in formulations or in the use forms prepared from these formulations in a mixture with further compounds, preferably those as described below.

If one of the compounds mentioned below can occur in different tautomeric forms, these forms are also included even if not explicitly mentioned in each case. All the mixing components mentioned, as the case may be, may also form salts with suitable bases or acids if they are capable of doing so on the basis of their functional groups.

Insecticides/acaricides/nematicides

The active compounds specified here with their common names are known and are described for example in "The Pesticide Manual", 16th ed., British Crop Protection Council 2012, or can be searched for on the

Internet (e.g. http://www.alanwood.net/pesticides). The classification is based on the IRAC Mode of Action Classification Scheme applicable at the time of filing of this patent application.

(1) Acetylcholinesterase (AChE) inhibitors, for example carbamates, e.g. alanycarb, aldicarb, bendiocarb, benfuracarb, butocarboxim, butoxycarboxim, carbaryl, carbofuran, carbosulfan, ethiofencarb, fenobucarb, formetanate, furathiocarb, isoprocarb, methiocarb, methomyl, metolcarb, oxamyl, pirimicarb, propoxur, thiodicarb, thiofanox, triazamate, trimethacarb, XMC and xylylcarb; or organophosphates, e.g. acephate, azamethiphos, azinphos-ethyl, azinphos-methyl, cadusafos, chlorethoxyfos, chlorfenvinphos, chlormephos, chlorpyrifos-methyl, coumaphos, cyanophos, demeton-S-methyl, diazinon, dichlorvos/DDVP, dicrotophos, dimethoate, dimethylvinphos, disulfoton, EPN, ethion, ethoprophos, famphur, fenamiphos, fenitrothion, fenthion, fosthiazate, heptenophos, imicyafos, isofenphos, isopropyl O-(methoxyaminothiophosphoryl) salicylate, isoxathion, malathion, mecarbam, methamidophos, methidathion, mevinphos, monocrotophos, naled, omethoate, oxydemeton-methyl, parathion-methyl, phenthoate, phorate, phosalone, phosmet, phosphamidon, phoxim, pirimiphos-methyl, profenofos, propetamphos, prothiofos, pyraclofos, pyridaphenthion, quinalphos, sulfotep, tebupirimfos, temephos, terbufos, tetrachlorvinphos, thiometon, triazophos, triclorfon and vamidothion.

(2) GABA-gated chloride channel blockers, for example cyclodiene-organochlorines, e.g. chlordane and endosulfan or phenylpyrazoles (fiproles), e.g. ethiprole and fipronil.

(3) Sodium channel modulators, for example pyrethroids, e.g. acrinathrin, allethrin, d-cis-trans allethrin, d-trans allethrin, bifenthrin, bioallethrin, bioallethrin S-cyclopentenyl isomer, bioresmethrin, cycloprothrin, cyfluthrin, beta-cyfluthrin, cyhalothrin, lambda-cyhalothrin, gamma-cyhalothrin, cypermethrin, alpha-cypermethrin, beta-cypermethrin, theta-cypermethrin, zeta-cypermethrin, cyphenothrin [(1R)-trans isomer], deltamethrin, empenthrin [(EZ)-(1R) isomer], esfenvalerate, etofenprox, fenpropathrin, fenvalerate, flucythrinate, flumethrin, tau-fluvalinate, halfenprox, imiprothrin, kadethrin, momfluorothrin, permethrin, phenothrin [(1R)-trans isomer], prallethrin, pyrethrins (pyrethrum), resmethrin, silafluofen, tefluthrin, tetramethrin, tetramethrin [(1R) isomer], tralomethrin and transfluthrin or DDT or methoxychlor.

(4) Nicotinic acetylcholine receptor (nAChR) competitive modulators, for example neonicotinoids, e.g. acetamiprid, clothianidin, dinotefuran, imidacloprid, nitenpyram, thiacloprid and thiamethoxam or nicotine or sulfoxaflor or flupyradifurone.

(5) Nicotinic acetylcholine receptor (nAChR) allosteric modulators, for example spinosyns, e.g. spinetoram and spinosad.

(6) Glutamate-gated chloride channel (GluCl) allosteric modulators, for example avermectins/milbemycins, e.g. abamectin, emamectin benzoate, lepimectin and milbemectin.

(7) Juvenile hormone mimetics, for example juvenile hormone analogues, e.g. hydroprene, kinoprene and methoprene or fenoxycarb or pyriproxyfen.

(8) Miscellaneous non-specific (multisite) inhibitors, for example alkyl halides, e.g. methyl bromide and other alkyl halides; or chloropicrin or sulfuryl fluoride or borax or tartar emetic or methyl isocyanate generator, e.g. diazomet and metam.

(9) Chordotonal organ modulators, e.g. pymetrozine or flonicamide.

(10) Mite growth inhibitors, for example clofentezine, hexythiazox and diflovidazin or etoxazole.

(11) Microbial disruptors of the insect midgut membrane, for example *Bacillus thuringiensis* subspecies *israelensis*, *Bacillus sphaericus*, *Bacillus thuringiensis* subspecies *aizawai*, *Bacillus thuringiensis* subspecies *kurstaki*, *Bacillus thuringiensis* subspecies *tenebrionis* and *B.t.* plant proteins: Cry1Ab, Cry1Ac, Cry1Fa, Cry1A.105, Cry2Ab, Vip3A, mCry3A, Cry3Ab, Cry3Bb, Cry34 Ab1/35Ab1; or

(12) Inhibitors of mitochondrial ATP synthase, such as ATP disruptors, for example diafenthiuron or organotin compounds, e.g. azocyclotin, cyhexatin and fenbutatin oxide or propargite or tetradifon.

(13) Uncouplers of oxidative phosphorylation via disruption of the proton gradient, for example chlorfenapyr, DNOC and sulfluramid.

(14) Nicotinic acetylcholine receptor channel blockers, for example bensultap, cartap hydrochloride, thiocyclam, and thiosultap-sodium.

(15) Inhibitors of chitin biosynthesis, type 0, for example bistrifluron, chlorfluazuron, diflubenzuron, flucycloxuron, flufenoxuron, hexaflumuron, lufenuron, novaluron, noviflumuron, teflubenzuron and triflumuron.

(16) Inhibitors of chitin biosynthesis, type 1, for example buprofezin.

(17) Moulting disruptors (especially in the case of Diptera), for example cyromazine.

(18) Ecdysone receptor agonists, for example chromafenozide, halofenozide, methoxyfenozide and tebufenozide.

(19) Octopamine receptor agonists, for example amitraz.

(20) Mitochondrial complex III electron transport inhibitors, for example hydramethylnon or acequinocyl or fluacrypyrim.

(21) Mitochondrial complex I electron transport inhibitors, for example METI acaricides, e.g. fenazaquin, fenpyroximate, pyrimidifen, pyridaben, tebufenpyrad and tolfenpyrad or rotenone (Derris).

(22) Voltage-dependent sodium channel blockers, for example indoxacarb or metaflumizone.

(23) Inhibitors of acetyl CoA carboxylase, for example tetronic and tetramic acid derivatives, e.g. spirodiclofen, spiromesifen and spirotetramat.

(24) Mitochondrial complex IV electron transport inhibitors, for example phosphines, e.g. aluminium phosphide, calcium phosphide, phosphine and zinc phosphide, or cyanides, calcium cyanide, potassium cyanide and sodium cyanide.

(25) Mitochondrial complex II electron transport inhibitors, for example beta-keto nitrile derivatives, e.g. cyenopyrafen and cyflumetofen and carboxanilides, for example pyflubumide.

(28) Ryanodine receptor modulators, for example diamides, e.g. chlorantraniliprole, cyantraniliprole and flubendiamide,

further active compounds, for example afidopyropen, afoxolaner, azadirachtin, benclothiaz, benzoximate, bifenazate, broflanilide, bromopropylate, chinomethionat, chloroprallethrin, cryolite, cyclaniliprole, cycloxaprid, cyhalodiamide, dicloromezotiaz, dicofol, epsilon metofluthrin, epsilon momfluthrin, flometoquin, fluazaindolizine, fluensulfone, flufenerim, flufenoxystrobin, flufiprole, fluhexafon, fluopyram, fluralaner, fluxametamide, fufenozide, guadipyr, heptafluthrin, imidaclothiz, iprodione, kappa bifenthrin, kappa tefluthrin, lotilaner, meperfluthrin, paichongding, pyridalyl, pyrifluquinazon, pyriminostrobin, spirobudiclofen, tetramethylfluthrin, tetraniliprole, tetrachlorantraniliprole, tioxazafen, thiofluoximate, triflumezopyrim and iodomethane; additionally preparations based on *Bacillus firmus* (I-1582, BioNeem, Votivo), and the following compounds: 1-{2-fluoro-4-methyl-5-[(2,2,2-trifluoroethyl)sulfinyl]phenyl}-3-(trifluoromethyl)-1H-1,2,4-triazole-5-amine (known from WO2006/043635) (CAS 885026-50-6), {1'-[(2E)-3-(4-chlorophenyl)prop-2-en-1-yl]-5-fluorospiro[indole-3,4'-piperidine]-1(2H)-yl}(2-chloropyridin-4-yl)methanone (known from WO2003/106457) (CAS 637360-23-7), 2-chloro-N-[2-{1-[(2E)-3-(4-chlorophenyl)prop-2-en-1-yl]piperidin-4-yl}-4-(trifluoromethyl)phenyl]isonicotinamide (known from WO2006/003494) (CAS 872999-66-1), 3-(4-chloro-2,6-dimethylphenyl)-4-hydroxy-8-methoxy-1,8-diazaspiro[4.5]dec-3-en-2-one (known from WO 2010052161) (CAS 1225292-17-0), 3-(4-chloro-2,6-dimethylphenyl)-8-methoxy-2-oxo-1,8-diazaspiro[4.5]dec-3-en-4-yl ethylcarbonate (known from EP 2647626) (CAS-1440516-42-6), 4-(but-2-yn-1-yloxy)-6-(3,5-dimethylpiperidin-1-yl)-5-fluoropyrimidine (known from WO2004/099160) (CAS 792914-58-0), PF1364 (known from JP2010/018586) (CAS Reg.No. 1204776-60-2), N-[(2E)-1-[(6-chloropyridin-3-yl)methyl]pyridin-2(1H)-ylidene]-2,2,2-trifluoroacetamide (known from WO2012/029672) (CAS 1363400-41-2), (3E)-3-[1-[(6-chloro-3-pyridyl)methyl]-2-pyridylidene]-1,1,1-trifluoropropan-2-one (known from WO2013/144213) (CAS 1461743-15-6), N-[3-(benzylcarbamoyl)-4-

chlorophenyl]-1-methyl-3-(pentafluoroethyl)-4-(trifluoromethyl)-1H-pyrazole-5-carboxamide (known from WO2010/051926) (CAS 1226889-14-0), 5-bromo-4-chloro-N-[4-chloro-2-methyl-6-(methylcarbamoyl)phenyl]-2-(3-chloro-2-pyridyl)pyrazole-3-carboxamide (known from CN103232431) (CAS 1449220-44-3), 4-[5-(3,5-dichlorophenyl)-4,5-dihydro-5-(trifluoromethyl)-3-isoxazolyl]-2-methyl-N-(cis-1-oxido-3-thietanyl)benzamide, 4-[5-(3,5-dichlorophenyl)-4,5-dihydro-5-(trifluoromethyl)-3-isoxazolyl]-2-methyl-N-(trans-1-oxido-3-thietanyl)benzamide and 4-[(5S)-5-(3,5-dichlorophenyl)-4,5-dihydro-5-(trifluoromethyl)-3-isoxazolyl]-2-methyl-N-(cis-1-oxido-3-thietanyl)benzamide (known from WO 2013/050317 A1) (CAS 1332628-83-7), N-[3-chloro-1-(3-pyridinyl)-1H-pyrazol-4-yl]-N-ethyl-3-[(3,3,3-trifluoropropyl)sulfinyl]propanamide, (+)-N-[3-chloro-1-(3-pyridinyl)-1H-pyrazol-4-yl]-N-ethyl-3-[(3,3,3-trifluoropropyl)sulfinyl]propanamide and (-)-N-[3-chloro-1-(3-pyridinyl)-1H-pyrazol-4-yl]-N-ethyl-3-[(3,3,3-trifluoropropyl)sulfinyl]propanamide (known from WO 2013/162715 A2, WO 2013/162716 A2, US 2014/0213448 A1) (CAS 1477923-37-7), 5-[[(2E)-3-chloro-2-propen-1-yl]amino]-1-[2,6-dichloro-4-(trifluoromethyl)phenyl]-4-[(trifluoromethyl)sulfinyl]-1H-pyrazole-3-carbonitrile (known from CN 101337937 A) (CAS 1105672-77-2), 3-bromo-N-[4-chloro-2-methyl-6-[(methylamino)thioxomethyl]phenyl]-1-(3-chloro-2-pyridinyl)-1H-pyrazole-5-carboxamide, (Liudaibenjiaxuanan, known from CN 103109816 A) (CAS 1232543-85-9); N-[4-chloro-2-[[(1,1-dimethylethyl)amino]carbonyl]-6-methylphenyl]-1-(3-chloro-2-pyridinyl)-3-(fluoromethoxy)-1H-pyrazole-5-carboxamide (known from WO 2012/034403 A1) (CAS 1268277-22-0), N-[2-(5-amino-1,3,4-thiadiazol-2-yl)-4-chloro-6-methylphenyl]-3-bromo-1-(3-chloro-2-pyridinyl)-1H-pyrazole-5-carboxamide (known from WO 2011/085575 A1) (CAS 1233882-22-8), 4-[3-[2,6-dichloro-4-[(3,3-dichloro-2-propen-1-yl)oxy]phenoxy]propoxy]-2-methoxy-6-(trifluoromethyl)pyrimidine (known from CN 101337940 A) (CAS 1108184-52-6); (2E)- and 2(Z)-2-[2-(4-cyanophenyl)-1-[3-(trifluoromethyl)phenyl]ethylidene]-N-[4-(difluoromethoxy)phenyl]hydrazinecarboxamide (known from CN 101715774 A) (CAS 1232543-85-9); cyclopropanecarboxylic acid 3-(2,2-dichloroethenyl)-2,2-dimethyl-4-(1H-benzimidazol-2-yl)phenyl ester (known from CN 103524422 A) (CAS 1542271-46-4); (4aS)-7-chloro-2,5-dihydro-2-[[(methoxycarbonyl)[4-[(trifluoromethyl)thio]phenyl]amino]carbonyl]indeno[1,2-e][1,3,4]oxadiazine-4a(3H)-carboxylic acid methyl ester (known from CN 102391261 A) (CAS 1370358-69-2); 6-deoxy-3-O-ethyl-2,4-di-O-methyl-1-[N-[4-[1-[4-(1,1,2,2,2-pentafluoroethoxy)phenyl]-1H-1,2,4-triazole-3-yl]phenyl]carbamate]-α-L-mannopyranose (known from US 2014/0275503 A1) (CAS 1181213-14-8); 8-(2-cyclopropylmethoxy-4-trifluoromethylphenoxy)-3-(6-trifluoromethylpyridazin-3-yl)-3-azabicyclo[3.2.1]octane (CAS 1253850-56-4), (8-anti)-8-(2-cyclopropylmethoxy-4-trifluoromethylphenoxy)-3-(6-trifluoromethylpyridazin-3-yl)-3-azabicyclo[3.2.1]octane (CAS 933798-27-7), (8-syn)-8-(2-cyclopropylmethoxy-4-trifluoromethylphenoxy)-3-(6-trifluoromethylpyridazin-3-yl)-3-azabicyclo[3.2.1]octane (known from WO 2007040280 A1, WO 2007040282 A1) (CAS 934001-66-8) and N-[3-chloro-1-(3-pyridinyl)-1H-pyrazol-4-yl]-N-ethyl-3-[(3,3,3-trifluoropropyl)thio]propanamide (known from WO 2015/058021 A1, WO 2015/058028 A1) (CAS 1477919-27-9).

Fungicides

The active compounds specified herein by their common name are known and described, for example, in "Pesticide Manual" (16th Ed. British Crop Protection Council) or searchable on the internet (for example: http://www.alanwood.net/pesticides).

All the mixing components mentioned in classes (1) to (15), as the case may be, may form salts with suitable bases or acids if they are capable of doing so on the basis of their functional groups. All the fungicidal mixing components mentioned in classes (1) to (15), as the case may be, may include tautomeric forms.

1) Ergosterol biosynthesis inhibitors, for example (1.001) cyproconazole, (1.002) difenoconazole, (1.003) epoxiconazole, (1.004) fenhexamid, (1.005) fenpropidin, (1.006) fenpropimorph, (1.007) fenpyrazamine, (1.008) fluquinconazole, (1.009) flutriafol, (1.010) imazalil, (1.011) imazalil sulfate, (1.012) ipconazole, (1.013) metconazole, (1.014) myclobutanil, (1.015) paclobutrazol, (1.016) prochloraz, (1.017) propiconazole, (1.018) prothioconazole, (1.019) pyrisoxazole, (1.020) spiroxamine, (1.021) tebuconazole, (1.022) tetraconazole, (1.023) triadimenol, (1.024) tridemorph, (1.025) triticonazole, (1.026) (1R,2S,5S)-5-(4-chlorobenzyl)-2-(chloromethyl)-2-methyl-1-(1H-1,2,4-triazol-1-ylmethyl)cyclopentanol, (1.027) (1S,2R,5R)-5-(4-chlorobenzyl)-2-(chloromethyl)-2-methyl-1-(1H-1,2,4-triazol-1-ylmethyl)cyclopentanol, (1.028) (2R)-2-(1-chlorocyclopropyl)-4-[(1R)-2,2-dichlorocyclopropyl]-1-(1H-1,2,4-triazol-1-yl)butan-2-ol (1.029) (2R)-2-(1-chlorocyclopropyl)-4-[(1S)-2,2-dichlorocyclopropyl]-1-(1H-1,2,4-triazol-1-yl)butan-2-ol, (1.030) (2R)-2-[4-(4-chlorophenoxy)-2-(trifluoromethyl)phenyl]-1-(1H-1,2,4-triazol-1-yl)propan-2-ol, (1.031) (2S)-2-(1-chlorocyclopropyl)-4-[(1R)-2,2-dichlorocyclopropyl]-1-(1H-1,2,4-triazol-1-yl)butan-2-ol, (1.032) (2S)-2-(1-chlorocyclopropyl)-4-[(1S)-2,2-dichlorocyclopropyl]-1-(1H-1,2,4-triazol-1-yl)butan-2-ol, (1.033) (2S)-2-[4-(4-chlorophenoxy)-2-(trifluoromethyl)phenyl]-1-(1H-1,2,4-triazol-1-yl)propan-2-ol, (1.034) (R)-[3-(4-chloro-2-fluorophenyl)-5-(2,4-difluorophenyl)-1,2-oxazol-4-yl](pyridin-3-yl)methanol, (1.035) (S)-[3-(4-chloro-2-fluorophenyl)-5-(2,4-difluorophenyl)-1,2-oxazol-4-yl](pyridin-3-yl)methanol, (1.036) [3-(4-chloro-2-fluorophenyl)-5-(2,4-difluorophenyl)-1,2-oxazol-4-yl](pyridin-3-yl)methanol, (1.037) 1-({(2R,4S)-2-[2-chloro-4-(4-chlorophenoxy)phenyl]-4-methyl-1,3-dioxolan-2-yl}methyl)-1H-1,2,4-triazole, (1.038) 1-({(2S,4S)-2-[2-chloro-4-(4-chlorophenoxy)phenyl]-4-methyl-1,3-dioxolan-2-yl}methyl)-1H-1,2,4-triazole, (1.039) 1-{[3-(2-chlorophenyl)-2-(2,4-difluorophenyl)oxiran-2-yl]methyl}-1H-1,2,4-triazol-5-yl thiocyanate, (1.040) 1-{[rel(2R,3R)-3-(2-chlorophenyl)-2-(2,4-difluorophenyl)oxiran-2-yl]methyl}-1H-1,2,4-triazol-5-yl thiocyanate, (1.041) 1-{[rel(2R,3S)-3-(2-chlorophenyl)-2-(2,4-difluorophenyl)oxiran-2-yl]methyl}-1H-1,2,4-triazol-5-yl thiocyanate, (1.042) 2-[(2R,4R,5R)-1-(2,4-dichlorophenyl)-5-hydroxy-2,6,6-trimethylheptan-4-yl]-2,4-dihydro-3H-1,2,4-triazole-3-thione, (1.043) 2-[(2R,4R,5S)-1-(2,4-dichlorophenyl)-5-hydroxy-2,6,6-trimethylheptan-4-yl]-2,4-dihydro-3H-1,2,4-triazole-3-thione, (1.044) 2-[(2R,4S,5R)-1-(2,4-dichlorophenyl)-5-hydroxy-2,6,6-trimethylheptan-4-yl]-2,4-dihydro-3H-1,2,4-triazole-3-thione, (1.045) 2-[(2R,4S,5S)-1-(2,4-dichlorophenyl)-5-hydroxy-2,6,6-trimethylheptan-4-yl]-2,4-dihydro-3H-1,2,4-triazole-3-thione, (1.046) 2-[(2S,4R,5R)-1-(2,4-dichlorophenyl)-5-hydroxy-

2,6,6-trimethylheptan-4-yl]-2,4-dihydro-3H-1,2,4-triazole-3-thione, (1.047) 2-[(2S,4R,5S)-1-(2,4-dichlorophenyl)-5-hydroxy-2,6,6-trimethylheptan-4-yl]-2,4-dihydro-3H-1,2,4-triazole-3-thione, (1.048) 2-[(2S,4S,5R)-1-(2,4-dichlorophenyl)-5-hydroxy-2,6,6-trimethylheptan-4-yl]-2,4-dihydro-3H-1,2,4-triazole-3-thione, (1.049) 2-[(2S,4S,5S)-1-(2,4-dichlorophenyl)-5-hydroxy-2,6,6-trimethylheptan-4-yl]-2,4-dihydro-3H-1,2,4-triazole-3-thione, (1.050) 2-[1-(2,4-dichlorophenyl)-5-hydroxy-2,6,6-trimethylheptan-4-yl]-2,4-dihydro-3H-1,2,4-triazole-3-thione, (1.051) 2-[2-chloro-4-(2,4-dichlorophenoxy)phenyl]-1-(1H-1,2,4-triazol-1-yl)propan-2-ol, (1.052) 2-[2-chloro-4-(4-chlorophenoxy)phenyl]-1-(1H-1,2,4-triazol-1-yl)butan-2-ol, (1.053) 2-[4-(4-chlorophenoxy)-2-(trifluoromethyl)phenyl]-1-(1H-1,2,4-triazol-1-yl)butan-2-ol, (1.054) 2-[4-(4-chlorophenoxy)-2-(trifluoromethyl)phenyl]-1-(1H-1,2,4-triazol-1-yl)pentan-2-ol, (1.055) 2-[4-(4-chlorophenoxy)-2-(trifluoromethyl)phenyl]-1-(1H-1,2,4-triazol-1-yl)propan-2-ol, (1.056) 2-{[3-(2-chlorophenyl)-2-(2,4-difluorophenyl)oxiran-2-yl]methyl}-2,4-dihydro-3H-1,2,4-triazole-3-thione, (1.057) 2-{[rel(2R,3R)-3-(2-chlorophenyl)-2-(2,4-difluorophenyl)oxiran-2-yl]methyl}-2,4-dihydro-3H-1,2,4-triazole-3-thione, (1.058) 2-{[rel(2R,3S)-3-(2-chlorophenyl)-2-(2,4-difluorophenyl)oxiran-2-yl]methyl}-2,4-dihydro-3H-1,2,4-triazole-3-thione, (1.059) 5-(4-chlorobenzyl)-2-(chloromethyl)-2-methyl-1-(1H-1,2,4-triazol-1-ylmethyl)cyclopentanol, (1.060) 5-(allylsulfanyl)-1-{[3-(2-chlorophenyl)-2-(2,4-difluorophenyl)oxiran-2-yl]methyl}-1H-1,2,4-triazole, (1.061) 5-(allylsulfanyl)-1-{[rel(2R,3R)-3-(2-chlorophenyl)-2-(2,4-difluorophenyl)oxiran-2-yl]methyl}-1H-1,2,4-triazole, (1.062) 5-(allylsulfanyl)-1-{[rel(2R,3S)-3-(2-chlorophenyl)-2-(2,4-difluorophenyl)oxiran-2-yl]methyl}-1H-1,2,4-triazole, (1.063) N'-(2,5-dimethyl-4-{[3-(1,1,2,2-tetrafluoroethoxy)phenyl]sulfanyl}phenyl)-N-ethyl-N-methylimidoformamide, (1.064) N'-(2,5-dimethyl-4-{[3-(2,2,2-trifluoroethoxy)phenyl]sulfanyl}phenyl)-N-ethyl-N-methylimidoformamide, (1.065) N'-(2,5-dimethyl-4-{[3-(2,2,3,3-tetrafluoropropoxy)phenyl]sulfanyl}phenyl)-N-ethyl-N-methylimidoformamide, (1.066) N'-(2,5-dimethyl-4-{[3-(pentafluoroethoxy)phenyl]sulfanyl}phenyl)-N-ethyl-N-methylimidoformamide, (1.067) N'-(2,5-dimethyl-4-{3-[(1,1,2,2-tetrafluoroethyl)sulfanyl]phenoxy}phenyl)-N-ethyl-N-methylimidoformamide, (1.068) N'-(2,5-dimethyl-4-{3-[(2,2,2-trifluoroethyl)sulfanyl]phenoxy}phenyl)-N-ethyl-N-methylimidoformamide, (1.069) N'-(2,5-dimethyl-4-{3-[(2,2,3,3-tetrafluoropropyl)sulfanyl]phenoxy}phenyl)-N-ethyl-N-methylimidoformamide, (1.070) N'-(2,5-dimethyl-4-{3-[(pentafluoroethyl)sulfanyl]phenoxy}phenyl)-N-ethyl-N-methylimidoformamide, (1.071) N'-(2,5-dimethyl-4-phenoxyphenyl)-N-ethyl-N-methylimidoformamide, (1.072) N'-(4-{[3-(difluoromethoxy)phenyl]sulfanyl}-2,5-dimethylphenyl)-N-ethyl-N-methylimidoformamide, (1.073) N'-(4-{3-[(difluoromethyl)sulfanyl]phenoxy}-2,5-dimethylphenyl)-N-ethyl-N-methylimidoformamide, (1.074) N'-[5-bromo-6-(2,3-dihydro-1H-inden-2-yloxy)-2-methylpyridin-3-yl]-N-ethyl-N-methylimidoformamide, (1.075) N'-{4-[(4,5-dichloro-1,3-thiazol-2-yl)oxy]-2,5-dimethylphenyl}-N-ethyl-N-methylimidoformamide, (1.076) N'-{5-bromo-6-[(1R)-1-(3,5-difluorophenyl)ethoxy]-2-methylpyridin-3-yl}-N-ethyl-N-methylimidoformamide, (1.077) N'-{5-bromo-6-[(1S)-1-(3,5-difluorophenyl)ethoxy]-2-methylpyridin-3-yl}-N-ethyl-N-methylimidoformamide, (1.078) N'-{5-bromo-6-[(cis-4-isopropylcyclohexyl)oxy]-2-methylpyridin-3-yl}-N-ethyl-N-methylimidoformamide, (1.079) N'-{5-bromo-6-[(trans-4-isopropylcyclohexyl)oxy]-2-

methylpyridin-3-yl}-N-ethyl-N-methylimidoformamide, (1.080) N'-{5-bromo-6-[1-(3,5-difluorophenyl)ethoxy]-2-methylpyridin-3-yl}-N-ethyl-N-methylimidoformamide, (1.081) mefentrifluconazole, (1.082) ipfentrifluconazole.

2) Inhibitors of the respiratory chain in complex I or II, for example (2.001) benzovindiflupyr, (2.002) bixafen, (2.003) boscalid, (2.004) carboxin, (2.005) fluopyram, (2.006) flutolanil, (2.007) fluxapyroxad, (2.008) furametpyr, (2.009) isofetamid, (2.010) isopyrazam (anti-epimeric enantiomer 1R,4S,9S), (2.011) isopyrazam (anti-epimeric enantiomer 1S,4R,9R), (2.012) isopyrazam (anti-epimeric racemate 1RS,4SR,9SR), (2.013) isopyrazam (mixture of the syn-epimeric racemate 1RS,4SR,9RS and the anti-epimeric racemate 1RS,4SR,9SR), (2.014) isopyrazam (syn-epimeric enantiomer 1R,4S,9R), (2.015) isopyrazam (syn-epimeric enantiomer 1S,4R,9S), (2.016) isopyrazam (syn-epimeric racemate 1RS,4SR,9RS), (2.017) penflufen, (2.018) penthiopyrad, (2.019) pydiflumetofen, (2.020) pyraziflumid, (2.021) sedaxane, (2.022) 1,3-dimethyl-N-(1,1,3-trimethyl-2,3-dihydro-1H-inden-4-yl)-1H-pyrazole-4-carboxamide, (2.023) 1,3-dimethyl-N-[(3R)-1,1,3-trimethyl-2,3-dihydro-1H-inden-4-yl]-1H-pyrazole-4-carboxamide, (2.024) 1,3-dimethyl-N-[(3S)-1,1,3-trimethyl-2,3-dihydro-1H-inden-4-yl]-1H-pyrazole-4-carboxamide, (2.025) 1-methyl-3-(trifluoromethyl)-N-[2'-(trifluoromethyl)biphenyl-2-yl]-1H-pyrazole-4-carboxamide, (2.026) 2-fluoro-6-(trifluoromethyl)-N-(1,1,3-trimethyl-2,3-dihydro-1H-inden-4-yl)benzamide, (2.027) 3-(difluoromethyl)-1-methyl-N-(1,1,3-trimethyl-2,3-dihydro-1H-inden-4-yl)-1H-pyrazole-4-carboxamide, (2.028) 3-(difluoromethyl)-1-methyl-N-[(3R)-1,1,3-trimethyl-2,3-dihydro-1H-inden-4-yl]-1H-pyrazole-4-carboxamide, (2.029) 3-(difluoromethyl)-1-methyl-N-[(3S)-1,1,3-trimethyl-2,3-dihydro-1H-inden-4-yl]-1H-pyrazole-4-carboxamide, (2.030) 3-(difluoromethyl)-N-(7-fluoro-1,1,3-trimethyl-2,3-dihydro-1H-inden-4-yl)-1-methyl-1H-pyrazole-4-carboxamide, (2.031) 3-(difluoromethyl)-N-[(3R)-7-fluoro-1,1,3-trimethyl-2,3-dihydro-1H-inden-4-yl]-1-methyl-1H-pyrazole-4-carboxamide, (2.032) 3-(difluoromethyl)-N-[(3S)-7-fluoro-1,1,3-trimethyl-2,3-dihydro-1H-inden-4-yl]-1-methyl-1H-pyrazole-4-carboxamide, (2.033) 5,8-difluoro-N-[2-(2-fluoro-4-{[4-(trifluoromethyl)pyridin-2-yl]oxy}phenyl)ethyl]quinazolin-4-amine, (2.034) N-(2-cyclopentyl-5-fluorobenzyl)-N-cyclopropyl-3-(difluoromethyl)-5-fluoro-1-methyl-1H-pyrazole-4-carboxamide, (2.035) N-(2-tert-butyl-5-methylbenzyl)-N-cyclopropyl-3-(difluoromethyl)-5-fluoro-1-methyl-1H-pyrazole-4-carboxamide, (2.036) N-(2-tert-butylbenzyl)-N-cyclopropyl-3-(difluoromethyl)-5-fluoro-1-methyl-1H-pyrazole-4-carboxamide, (2.037) N-(5-chloro-2-ethylbenzyl)-N-cyclopropyl-3-(difluoromethyl)-5-fluoro-1-methyl-1H-pyrazole-4-carboxamide, (2.038) N-(5-chloro-2-isopropylbenzyl)-N-cyclopropyl-3-(difluoromethyl)-5-fluoro-1-methyl-1H-pyrazole-4-carboxamide, (2.039) N-[(1R,4S)-9-(dichloromethylene)-1,2,3,4-tetrahydro-1,4-methanonaphthalen-5-yl]-3-(difluoromethyl)-1-methyl-1H-pyrazole-4-carboxamide, (2.040) N-[(1S,4R)-9-(dichloromethylene)-1,2,3,4-tetrahydro-1,4-methanonaphthalen-5-yl]-3-(difluoromethyl)-1-methyl-1H-pyrazole-4-carboxamide, (2.041) N-[1-(2,4-dichlorophenyl)-1-methoxypropan-2-yl]-3-(difluoromethyl)-1-methyl-1H-pyrazole-4-carboxamide, (2.042) N-[2-chloro-6-(trifluoromethyl)benzyl]-N-cyclopropyl-3-(difluoromethyl)-5-fluoro-1-methyl-1H-pyrazole-4-carboxamide, (2.043) N-[3-chloro-2-fluoro-6-(trifluoromethyl)benzyl]-N-cyclopropyl-3-(difluoromethyl)-5-fluoro-1-methyl-1H-pyrazole-4-

carboxamide, (2.044) N-[5-chloro-2-(trifluoromethyl)benzyl]-N-cyclopropyl-3-(difluoromethyl)-5-fluoro-1-methyl-1H-pyrazole-4-carboxamide, (2.045) N-cyclopropyl-3-(difluoromethyl)-5-fluoro-1-methyl-N-[5-methyl-2-(trifluoromethyl)benzyl]-1H-pyrazole-4-carboxamide, (2.046) N-cyclopropyl-3-(difluoromethyl)-5-fluoro-N-(2-fluoro-6-isopropylbenzyl)-1-methyl-1H-pyrazole-4-carboxamide, (2.047) N-cyclopropyl-3-(difluoromethyl)-5-fluoro-N-(2-isopropyl-5-methylbenzyl)-1-methyl-1H-pyrazole-4-carboxamide, (2.048) N-cyclopropyl-3-(difluoromethyl)-5-fluoro-N-(2-isopropylbenzyl)-1-methyl-1H-pyrazole-4-carbothioamide, (2.049) N-cyclopropyl-3-(difluoromethyl)-5-fluoro-N-(2-isopropylbenzyl)-1-methyl-1H-pyrazole-4-carboxamide, (2.050) N-cyclopropyl-3-(difluoromethyl)-5-fluoro-N-(5-fluoro-2-isopropylbenzyl)-1-methyl-1H-pyrazole-4-carboxamide, (2.051) N-cyclopropyl-3-(difluoromethyl)-N-(2-ethyl-4,5-dimethylbenzyl)-5-fluoro-1-methyl-1H-pyrazole-4-carboxamide, (2.052) N-cyclopropyl-3-(difluoromethyl)-N-(2-ethyl-5-fluorobenzyl)-5-fluoro-1-methyl-1H-pyrazole-4-carboxamide, (2.053) N-cyclopropyl-3-(difluoromethyl)-N-(2-ethyl-5-methylbenzyl)-5-fluoro-1-methyl-1H-pyrazole-4-carboxamide, (2.054) N-cyclopropyl-N-(2-cyclopropyl-5-fluorobenzyl)-3-(difluoromethyl)-5-fluoro-1-methyl-1H-pyrazole-4-carboxamide, (2.055) N-cyclopropyl-N-(2-cyclopropyl-5-methylbenzyl)-3-(difluoromethyl)-5-fluoro-1-methyl-1H-pyrazole-4-carboxamide, (2.056) N-cyclopropyl-N-(2-cyclopropylbenzyl)-3-(difluoromethyl)-5-fluoro-1-methyl-1H-pyrazole-4-carboxamide.

3) Inhibitors of the respiratory chain in complex III, for example (3.001) ametoctradin, (3.002) amisulbrom, (3.003) azoxystrobin, (3.004) coumethoxystrobin, (3.005) coumoxystrobin, (3.006) cyazofamid, (3.007) dimoxystrobin, (3.008) enoxastrobin, (3.009) famoxadon, (3.010) fenamidon, (3.011) flufenoxystrobin, (3.012) fluoxastrobin, (3.013) kresoxim-methyl, (3.014) metominostrobin, (3.015) orysastrobin, (3.016) picoxystrobin, (3.017) pyraclostrobin, (3.018) pyrametostrobin, (3.019) pyraoxystrobin, (3.020) trifloxystrobin (3.021) (2E)-2-{2-[({[(1E)-1-(3-{[(E)-1-fluoro-2-phenylvinyl]oxy}phenyl)ethylidene]amino}oxy)methyl]phenyl}-2-(methoxyimino)-N-methylacetamide, (3.022) (2E,3Z)-5-{[1-(4-chlorophenyl)-1H-pyrazol-3-yl]oxy}-2-(methoxyimino)-N,3-dimethylpent-3-enamide, (3.023) (2R)-2-{2-[(2,5-dimethylphenoxy)methyl]phenyl}-2-methoxy-N-methylacetamide, (3.024) (2S)-2-{2-[(2,5-dimethylphenoxy)methyl]phenyl}-2-methoxy-N-methylacetamide, (3.025) (3S,6S,7R,8R)-8-benzyl-3-[({3-[(isobutyryloxy)methoxy]-4-methoxypyridin-2-yl}carbonyl)amino]-6-methyl-4,9-dioxo-1,5-dioxonan-7-yl 2-methylpropanoate, (3.026) 2-{2-[(2,5-dimethylphenoxy)methyl]phenyl}-2-methoxy-N-methylacetamide, (3.027) N-(3-ethyl-3,5,5-trimethylcyclohexyl)-3-formamido-2-hydroxybenzamide, (3.028) (2E,3Z)-5-{[1-(4-chloro-2-fluorophenyl)-1H-pyrazol-3-yl]oxy}-2-(methoxyimino)-N,3-dimethylpent-3-enamide, (3.029) methyl {5-[3-(2,4-dimethylphenyl)-1H-pyrazol-1-yl]-2-methylbenzyl}carbamate.

4) Mitosis and cell division inhibitors, for example (4.001) carbendazim, (4.002) diethofencarb, (4.003) ethaboxam, (4.004) fluopicolid, (4.005) pencycuron, (4.006) thiabendazole, (4.007) thiophanate-methyl, (4.008) zoxamide, (4.009) 3-chloro-4-(2,6-difluorophenyl)-6-methyl-5-phenylpyridazine, (4.010) 3-chloro-5-(4-chlorophenyl)-4-(2,6-difluorophenyl)-6-methylpyridazine, (4.011) 3-chloro-5-(6-

chloropyridin-3-yl)-6-methyl-4-(2,4,6-trifluorophenyl)pyridazine, (4.012) 4-(2-bromo-4-fluorophenyl)-N-(2,6-difluorophenyl)-1,3-dimethyl-1H-pyrazol-5-amine, (4.013) 4-(2-bromo-4-fluorophenyl)-N-(2-bromo-6-fluorophenyl)-1,3-dimethyl-1H-pyrazol-5-amine, (4.014) 4-(2-bromo-4-fluorophenyl)-N-(2-bromophenyl)-1,3-dimethyl-1H-pyrazol-5-amine, (4.015) 4-(2-bromo-4-fluorophenyl)-N-(2-chloro-6-fluorophenyl)-1,3-dimethyl-1H-pyrazol-5-amine, (4.016) 4-(2-bromo-4-fluorophenyl)-N-(2-chlorophenyl)-1,3-dimethyl-1H-pyrazol-5-amine, (4.017) 4-(2-bromo-4-fluorophenyl)-N-(2-fluorophenyl)-1,3-dimethyl-1H-pyrazol-5-amine, (4.018) 4-(2-chloro-4-fluorophenyl)-N-(2,6-difluorophenyl)-1,3-dimethyl-1H-pyrazol-5-amine, (4.019) 4-(2-chloro-4-fluorophenyl)-N-(2-chloro-6-fluorophenyl)-1,3-dimethyl-1H-pyrazol-5-amine, (4.020) 4-(2-chloro-4-fluorophenyl)-N-(2-chlorophenyl)-1,3-dimethyl-1H-pyrazol-5-amine, (4.021) 4-(2-chloro-4-fluorophenyl)-N-(2-fluorophenyl)-1,3-dimethyl-1H-pyrazol-5-amine, (4.022) 4-(4-chlorophenyl)-5-(2,6-difluorophenyl)-3,6-dimethylpyridazine, (4.023) N-(2-bromo-6-fluorophenyl)-4-(2-chloro-4-fluorophenyl)-1,3-dimethyl-1H-pyrazol-5-amine, (4.024) N-(2-bromophenyl)-4-(2-chloro-4-fluorophenyl)-1,3-dimethyl-1H-pyrazol-5-amine, (4.025) N-(4-chloro-2,6-difluorophenyl)-4-(2-chloro-4-fluorophenyl)-1,3-dimethyl-1H-pyrazol-5-amine.

5) Compounds having capacity for multisite activity, for example (5.001) Bordeaux mixture, (5.002) captafol, (5.003) captan, (5.004) chlorthalonil, (5.005) copper hydroxide, (5.006) copper naphthenate, (5.007) copper oxide, (5.008) copper oxychloride, (5.009) copper(2+) sulfate, (5.010) dithianon, (5.011) dodin, (5.012) folpet, (5.013) mancozeb, (5.014) maneb, (5.015) metiram, (5.016) zinc metiram, (5.017) copper oxine, (5.018) propineb, (5.019) sulfur and sulfur preparations including calcium polysulfide, (5.020) thiram, (5.021) zineb, (5.022) ziram, (5.023) 6-ethyl-5,7-dioxo-6,7-dihydro-5H-pyrrolo[3',4':5,6][1,4]dithiino[2,3-c][1,2]thiazole-3-carbonitrile.

6) Compounds capable of triggering host defence, for example (6.001) acibenzolar-S-methyl, (6.002) isotianil, (6.003) probenazole, (6.004) tiadinil.

7) Amino acid and/or protein biosynthesis inhibitors, for example (7.001) cyprodinil, (7.002) kasugamycin, (7.003) kasugamycin hydrochloride hydrate, (7.004) oxytetracycline, (7.005) pyrimethanil, (7.006) 3-(5-fluoro-3,3,4,4-tetramethyl-3,4-dihydroisoquinolin-1-yl)quinoline.

(8) ATP production inhibitors, for example (8.001) silthiofam.

9) Cell wall synthesis inhibitors, for example (9.001) benthiavalicarb, (9.002) dimethomorph, (9.003) flumorph, (9.004) iprovalicarb, (9.005) mandipropamid, (9.006) pyrimorph, (9.007) valifenalate, (9.008) (2E)-3-(4-tert-butylphenyl)-3-(2-chloropyridin-4-yl)-1-(morpholin-4-yl)prop-2-en-1-one, (9.009) (2Z)-3-(4-tert-butylphenyl)-3-(2-chloropyridin-4-yl)-1-(morpholin-4-yl)prop-2-en-1-one.

10) Lipid and membrane synthesis inhibitors, for example (10.001) propamocarb, (10.002) propamocarb hydrochloride, (10.003) tolclofos-methyl.

11) Melanin biosynthesis inhibitors, for example (11.001) tricyclazole, (11.002) 2,2,2-trifluoroethyl {3-methyl-1-[(4-methylbenzoyl)amino]butan-2-yl}carbamate.

12) Nucleic acid synthesis inhibitors, for example (12.001) benalaxyl, (12.002) benalaxyl-M (kiralaxyl), (12.003) metalaxyl, (12.004) metalaxyl-M (mefenoxam).

13) Signal transduction inhibitors, for example (13.001) fludioxonil, (13.002) iprodione, (13.003) procymidone, (13.004) proquinazid, (13.005) quinoxyfen, (13.006) vinclozolin.

14) Compounds that can act as uncouplers, for example (14.001) fluazinam, (14.002) meptyldinocap.

15) Further compounds, for example (15.001) abscisic acid, (15.002) benthiazole, (15.003) bethoxazin, (15.004) capsimycin, (15.005) carvone, (15.006) chinomethionat, (15.007) cufraneb, (15.008) cyflufenamid, (15.009) cymoxanil, (15.010) cyprosulfamide, (15.011) flutianil, (15.012) fosetyl-aluminium, (15.013) fosetyl-calcium, (15.014) fosetyl-sodium, (15.015) methyl isothiocyanate, (15.016) metrafenon, (15.017) mildiomycin, (15.018) natamycin, (15.019) nickel dimethyldithiocarbamate, (15.020) nitrothal-isopropyl, (15.021) oxamocarb, (15.022) oxathiapiprolin, (15.023) oxyfenthiin, (15.024) pentachlorophenol and salts, (15.025) phosphonic acid and salts thereof, (15.026) propamocarb-fosetylate, (15.027) pyriofenone (chlazafenone) (15.028) tebufloquin, (15.029) tecloftalam, (15.030) tolnifanide, (15.031) 1-(4-{4-[(5R)-5-(2,6-difluorophenyl)-4,5-dihydro-1,2-oxazol-3-yl]-1,3-thiazol-2-yl}piperidin-1-yl)-2-[5-methyl-3-(trifluoromethyl)-1H-pyrazol-1-yl]ethanone, (15.032) 1-(4-{4-[(5S)-5-(2,6-difluorophenyl)-4,5-dihydro-1,2-oxazol-3-yl]-1,3-thiazol-2-yl}piperidin-1-yl)-2-[5-methyl-3-(trifluoromethyl)-1H-pyrazol-1-yl]ethanone, (15.033) 2-(6-benzylpyridin-2-yl)quinazoline, (15.034) 2,6-dimethyl-1H,5H-[1,4]dithiino[2,3-c:5,6-c']dipyrrole-1,3,5,7(2H,6H)-tetrone, (15.035) 2-[3,5-bis(difluoromethyl)-1H-pyrazol-1-yl]-1-[4-(4-{5-[2-(prop-2-yn-1-yloxy)phenyl]-4,5-dihydro-1,2-oxazol-3-yl}-1,3-thiazol-2-yl)piperidin-1-yl]ethanone, (15.036) 2-[3,5-bis(difluoromethyl)-1H-pyrazol-1-yl]-1-[4-(4-{5-[2-chloro-6-(prop-2-yn-1-yloxy)phenyl]-4,5-dihydro-1,2-oxazol-3-yl}-1,3-thiazol-2-yl)piperidin-1-yl]ethanone, (15.037) 2-[3,5-bis(difluoromethyl)-1H-pyrazol-1-yl]-1-[4-(4-{5-[2-fluoro-6-(prop-2-yn-1-yloxy)phenyl]-4,5-dihydro-1,2-oxazol-3-yl}-1,3-thiazol-2-yl)piperidin-1-yl]ethanone, (15.038) 2-[6-(3-fluoro-4-methoxyphenyl)-5-methylpyridin-2-yl]quinazoline, (15.039) 2-{(5R)-3-[2-(1-{[3,5-bis(difluoromethyl)-1H-pyrazol-1-yl]acetyl}piperidin-4-yl)-1,3-thiazol-4-yl]-4,5-dihydro-1,2-oxazol-5-yl}-3-chlorophenyl methanesulfonate, (15.040) 2-{(5S)-3-[2-(1-{[3,5-bis(difluoromethyl)-1H-pyrazol-1-yl]acetyl}piperidin-4-yl)-1,3-thiazol-4-yl]-4,5-dihydro-1,2-oxazol-5-yl}-3-chlorophenyl methanesulfonate, (15.041) 2-{2-[(7,8-difluoro-2-methylquinolin-3-yl)oxy]-6-fluorophenyl}propan-2-ol, (15.042) 2-{2-fluoro-6-[(8-fluoro-2-methylquinolin-3-yl)oxy]phenyl}propan-2-ol, (15.043) 2-{3-[2-(1-{[3,5-bis(difluoromethyl)-1H-pyrazol-1-yl]acetyl}piperidin-4-yl)-1,3-thiazol-4-yl]-4,5-dihydro-1,2-oxazol-5-yl}-3-chlorophenyl methanesulfonate, (15.044) 2-{3-[2-(1-{[3,5-bis(difluoromethyl)-1H-pyrazol-1-yl]acetyl}piperidin-4-yl)-1,3-thiazol-4-yl]-4,5-dihydro-1,2-oxazol-5-yl}phenyl methanesulfonate, (15.045) 2-phenylphenol and salts thereof, (15.046) 3-(4,4,5-trifluoro-3,3-dimethyl-3,4-dihydroisoquinolin-1-yl)quinoline, (15.047) 3-(4,4-difluoro-3,3-dimethyl-3,4-dihydroisoquinolin-1-

yl)quinoline, (15.048) 4-amino-5-fluoropyrimidin-2-ol (tautomeric form: 4-amino-5-fluoropyrimidin-2(1H)-one), (15.049) 4-oxo-4-[(2-phenylethyl)amino]butyric acid, (15.050) 5-amino-1,3,4-thiadiazole-2-thiol, (15.051) 5-chloro-N'-phenyl-N'-(prop-2-yn-1-yl)thiophene 2-sulfonohydrazide, (15.052) 5-fluoro-2-[(4-fluorobenzyl)oxy]pyrimidin-4-amine, (15.053) 5-fluoro-2-[(4-methylbenzyl)oxy]pyrimidin-4-amine, (15.054) 9-fluoro-2,2-dimethyl-5-(quinolin-3-yl)-2,3-dihydro-1,4-benzoxazepine, (15.055) but-3-yn-1-yl {6-[({[(Z)-(1-methyl-1H-tetrazol-5-yl)(phenyl)methylene]amino}oxy)methyl]pyridin-2-yl}carbamate, (15.056) ethyl (2Z)-3-amino-2-cyano-3-phenylacrylate, (15.057) phenazine-1-carboxylic acid, (15.058) propyl 3,4,5-trihydroxybenzoate, (15.059) quinolin-8-ol, (15.060) quinolin-8-ol sulfate (2:1), (15.061) tert-butyl {6-[({[(1-methyl-1H-tetrazol-5-yl)(phenyl)methylene]amino}oxy)methyl]pyridin-2-yl}carbamate, (15.062) 5-fluoro-4-imino-3-methyl-1-[(4-methylphenyl)sulfonyl]-3,4-dihydropyrimidin-2(1H)-one.

Biological pesticides as mixing components

The compounds of the formula (I) can be combined with biological pesticides.

Biological pesticides especially include bacteria, fungi, yeasts, plant extracts and products formed by microorganisms, including proteins and secondary metabolites.

Biological pesticides include bacteria such as spore-forming bacteria, root-colonizing bacteria and bacteria which act as biological insecticides, fungicides or nematicides.

Examples of such bacteria which are used or can be used as biological pesticides are:

Bacillus amyloliquefaciens, strain FZB42 (DSM 231179), or *Bacillus cereus,* especially *B. cereus* strain CNCM I-1562 or *Bacillus firmus*, strain I-1582 (Accession number CNCM I-1582) or *Bacillus pumilus*, especially strain GB34 (Accession No. ATCC 700814) and strain QST2808 (Accession No. NRRL B-30087), or *Bacillus subtilis*, especially strain GB03 (Accession No. ATCC SD-1397), or *Bacillus subtilis* strain QST713 (Accession No. NRRL B-21661) or *Bacillus subtilis* strain OST 30002 (Accession No. NRRL B-50421), *Bacillus thuringiensis*, especially *B. thuringiensis* subspecies *israelensis* (serotype H-14), strain AM65-52 (Accession No. ATCC 1276), or *B. thuringiensis subsp. aizawai*, especially strain ABTS-1857 (SD-1372), or *B. thuringiensis subsp. kurstaki* strain HD-1, or *B. thuringiensis subsp. tenebrionis* strain NB 176 (SD-5428), *Pasteuria penetrans*, *Pasteuria spp.* (Rotylenchulus reniformis nematode)-PR3 (Accession Number ATCC SD-5834), *Streptomyces microflavus* strain AQ6121 (= QRD 31.013, NRRL B-50550), *Streptomyces galbus* strain AQ 6047 (Accession Number NRRL 30232).

Examples of fungi and yeasts which are used or can be used as biological pesticides are:

Beauveria bassiana, in particular strain ATCC 74040, *Coniothyrium minitans*, in particular strain CON/M/91-8 (Accession No. DSM-9660), *Lecanicillium spp.*, in particular strain HRO LEC 12, *Lecanicillium lecanii* (formerly known as *Verticillium lecanii*), in particular strain KV01, *Metarhizium anisopliae*, in particular strain F52 (DSM3884/ ATCC 90448), *Metschnikowia fructicola*, in particular

strain NRRL Y-30752, *Paecilomyces fumosoroseus* (new: *Isaria fumosorosea*), in particular strain IFPC 200613, or strain Apopka 97 (Accession No. ATCC 20874), *Paecilomyces lilacinus*, in particular *P. lilacinus* strain 251 (AGAL 89/030550), *Talaromyces flavus*, in particular strain V117b, *Trichoderma atroviride*, in particular strain SC1 (Accession Number CBS 122089), *Trichoderma harzianum*, in particular *T. harzianum rifai* T39 (accession number CNCM I-952).

Examples of viruses which are used or can be used as biological pesticides are:

Adoxophyes orana (summer fruit tortrix) granulosis virus (GV), *Cydia pomonella* (codling moth) granulosis virus (GV), *Helicoverpa armigera* (cotton bollworm) nuclear polyhedrosis virus (NPV), *Spodoptera exigua* (beet armyworm) mNPV, *Spodoptera frugiperda* (fall armyworm) mNPV, *Spodoptera littoralis* (African cotton leafworm) NPV.

Also included are bacteria and fungi which are added as 'inoculant' to plants or plant parts or plant organs and which, by virtue of their particular properties, promote plant growth and plant health. Examples include:

Agrobacterium spp., *Azorhizobium caulinodans*, *Azospirillum spp.*, *Azotobacter spp.*, *Bradyrhizobium spp.*, *Burkholderia spp.*, especially *Burkholderia cepacia* (formerly known as *Pseudomonas cepacia*), *Gigaspora spp.*, or *Gigaspora monosporum*, *Glomus spp.*, *Laccaria spp.*, *Lactobacillus buchneri*, *Paraglomus spp.*, *Pisolithus tinctorus*, *Pseudomonas spp.*, *Rhizobium spp.*, especially *Rhizobium trifolii*, *Rhizopogon spp.*, *Scleroderma spp.*, *Suillus spp.*, *Streptomyces spp.*

Examples of plant extracts and products formed by microorganisms, including proteins and secondary metabolites, which are used or can be used as biological pesticides are:

Allium sativum, Artemisia absinthium, azadirachtin, Biokeeper WP, Cassia nigricans, Celastrus angulatus, Chenopodium anthelminticum, chitin, Armour-Zen, Dryopteris filix-mas, Equisetum arvense, Fortune Aza, Fungastop, Heads Up (Chenopodium quinoa saponin extract), pyrethrum/pyrethrins, Quassia amara, Quercus, Quillaja, Regalia, "Requiem ™ Insecticide", rotenone, ryania/ryanodine, Symphytum officinale, Tanacetum vulgare, thymol, Triact 70, TriCon, Tropaeulum majus, Urtica dioica, Veratrin, Viscum album, Brassicaceae extract, especially oilseed rape powder or mustard powder.

Safener as mixing components

The compounds of the formula (I) can be combined with safeners, for example benoxacor, cloquintocet (-mexyl), cyometrinil, cyprosulfamide, dichlormid, fenchlorazole (-ethyl), fenclorim, flurazole, fluxofenim, furilazole, isoxadifen (-ethyl), mefenpyr (-diethyl), naphthalic anhydride, oxabetrinil, 2-methoxy-N-({4-[(methylcarbamoyl)amino]phenyl}sulfonyl)benzamide (CAS 129531-12-0), 4-(dichloroacetyl)-1-oxa-4-azaspiro[4.5]decane (CAS 71526-07-3), 2,2,5-trimethyl-3-(dichloroacetyl)-1,3-oxazolidine (CAS 52836-31-4).

Plants and plant parts

All plants and plant parts can be treated in accordance with the invention. Plants are understood here to mean all plants and populations of plants, such as desirable and undesirable wild plants or crop plants (including naturally occurring crop plants), for example cereals (wheat, rice, triticale, barley, rye, oats), maize, soya beans, potatoes, sugar beet, sugar cane, tomatoes, bell peppers, cucumbers, melons, carrots, water melons, onions, lettuce, spinach, leeks, beans, *Brassica oleracea* (e.g. cabbage) and other vegetable species, cotton, tobacco, oilseed rape, and also fruit plants (the fruits being apples, pears, citrus fruits and grapes). Crop plants may be plants which can be obtained by conventional breeding and optimization methods or by biotechnological and genetic engineering methods or combinations of these methods, including the transgenic plants and including the plant cultivars which are protectable or non-protectable by plant breeders' rights. Plants shall be understood to mean all development stages such as seed, seedlings, young (immature) plants, up to and including mature plants. Plant parts shall be understood to mean all parts and organs of the plants above and below ground, such as shoot, leaf, flower and root, examples given being leaves, needles, stalks, stems, flowers, fruit bodies, fruits and seeds, and also roots, tubers and rhizomes. Plant parts also include harvested plants or harvested plant parts and vegetative and generative propagation material, for example cuttings, tubers, rhizomes, slips and seeds.

The inventive treatment of the plants and parts of plants with the compounds of the formula (I) is effected directly or by allowing the compounds to act on the surroundings, the habitat or the storage space thereof by the customary treatment methods, for example by dipping, spraying, evaporating, fogging, scattering, painting on, injecting, and, in the case of propagation material, especially in the case of seeds, also by applying one or more coats.

As already mentioned above, it is possible to treat all plants and their parts in accordance with the invention. In a preferred embodiment, wild plant species and plant cultivars, or those obtained by conventional biological breeding methods, such as crossing or protoplast fusion, and parts thereof, are treated. In a further preferred embodiment, transgenic plants and plant cultivars obtained by genetic engineering methods, if appropriate in combination with conventional methods (genetically modified organisms), and parts thereof are treated. The term "parts" or "parts of plants" or "plant parts" has been explained above. Particular preference is given in accordance with the invention to treating plants of the respective commercially customary plant cultivars or those that are in use. Plant cultivars are understood to mean plants having new properties ("traits") and which have been obtained by conventional breeding, by mutagenesis or by recombinant DNA techniques. They may be cultivars, varieties, biotypes or genotypes.

Transgenic plants, seed treatment and integration events

The preferred transgenic plants or plant cultivars (those obtained by genetic engineering) which are to be treated in accordance with the invention include all plants which, through the genetic modification, received genetic material which imparts particular advantageous useful properties ("traits") to these plants. Examples of such properties are better plant growth, increased tolerance to high or low temperatures,

increased tolerance to drought or to levels of water or soil salinity, enhanced flowering performance, easier harvesting, accelerated ripening, higher harvest yields, higher quality and/or higher nutritional value of the harvested products, better capability for storage and/or processability of the harvested products. Further and particularly emphasized examples of such properties are increased resistance of the plants to animal and microbial pests, such as insects, arachnids, nematodes, mites, slugs and snails, owing, for example, to toxins formed in the plants, in particular those formed in the plants by the genetic material from Bacillus thuringiensis (for example by the genes CryIA(a), CryIA(b), CryIA(c), CryIIA, CryIIIA, CryIIIB2, Cry9c, Cry2Ab, Cry3Bb and CryIF and also combinations thereof), and also increased resistance of the plants to phytopathogenic fungi, bacteria and/or viruses caused, for example, by systemic acquired resistance (SAR), systemin, phytoalexins, elicitors and resistance genes and correspondingly expressed proteins and toxins, and also increased tolerance of the plants to certain active herbicidal compounds, for example imidazolinones, sulfonylureas, glyphosate or phosphinothricin (for example the "PAT" gene). The genes which impart the desired properties ("traits") in question may also be present in combinations with one another in the transgenic plants. Examples of transgenic plants mentioned include the important crop plants, such as cereals (wheat, rice, triticale, barley, rye, oats), maize, soya beans, potatoes, sugar beet, sugar cane, tomatoes, peas and other types of vegetable, cotton, tobacco, oilseed rape and also fruit plants (the fruits being apples, pears, citrus fruits and grapevines), particular emphasis being given to maize, soya beans, wheat, rice, potatoes, cotton, sugar cane, tobacco and oilseed rape. Properties ("traits") which are particularly emphasized are the increased resistance of the plants to insects, arachnids, nematodes and slugs and snails.

Crop protection – types of treatment

The plants and plant parts are treated with the compounds of the formula (I) directly or by action on their surroundings, habitat or storage space using customary treatment methods, for example by dipping, spraying, atomizing, irrigating, evaporating, dusting, fogging, broadcasting, foaming, painting, spreading-on, injecting, watering (drenching), drip irrigating and, in the case of propagation material, in particular in the case of seed, additionally by dry seed treatment, liquid seed treatment, slurry treatment, by incrusting, by coating with one or more coats, etc. It is furthermore possible to apply the compounds of the formula (I) by the ultra-low volume method or to inject the application form or the compound of the formula (I) itself into the soil.

A preferred direct treatment of the plants is foliar application, meaning that the compounds of the formula (I) are applied to the foliage, in which case the treatment frequency and the application rate should be adjusted according to the level of infestation with the pest in question.

In the case of systemically active compounds, the compounds of the formula (I) also access the plants via the root system. The plants are then treated by the action of the compounds of the formula (I) on the habitat of the plant. This can be accomplished, for example, by drenching, or by mixing into the soil or the nutrient solution, meaning that the locus of the plant (e.g. soil or hydroponic systems) is impregnated with a liquid

form of the compounds of the formula (I), or by soil application, meaning that the compounds of the formula (I) according to the invention are introduced in solid form (e.g. in the form of granules) into the locus of the plants. In the case of paddy rice crops, this can also be accomplished by metering the compound of the formula (I) in a solid application form (for example as granules) into a flooded paddy field.

Seed treatment

The control of animal pests by the treatment of the seed of plants has long been known and is the subject of constant improvements. Nevertheless, the treatment of seed entails a series of problems which cannot always be solved in a satisfactory manner. Thus, it is desirable to develop methods for protecting the seed and the germinating plant which dispense with, or at least reduce considerably, the additional application of pesticides during storage, after sowing or after emergence of the plants. It is additionally desirable to optimize the amount of active compound used so as to provide optimum protection for the seed and the germinating plant from attack by animal pests, but without damage to the plant itself by the active compound used. In particular, methods for the treatment of seed should also take account of the intrinsic insecticidal or nematicidal properties of pest-resistant or -tolerant transgenic plants in order to achieve optimal protection of the seed and also the germinating plant with a minimum expenditure on pesticides.

The present invention therefore in particular also relates to a method for the protection of seed and germinating plants from attack by pests, by treating the seed with one of the compounds of the formula (I). The method according to the invention for protecting seed and germinating plants against attack by pests further comprises a method in which the seed is treated simultaneously in one operation or sequentially with a compound of the formula (I) and a mixing component. It further also comprises a method where the seed is treated at different times with a compound of the formula (I) and a mixing component.

The invention also relates to the use of the compounds of the formula (I) for the treatment of seed for protecting the seed and the resulting plant from animal pests.

The invention further relates to seed which has been treated with a compound of the formula (I) according to the invention for protection from animal pests. The invention also relates to seed which has been treated simultaneously with a compound of the formula (I) and a mixing component. The invention further relates to seed which has been treated at different times with a compound of the formula (I) and a mixing component. In the case of seed which has been treated at different times with a compound of the formula (I) and a mixing component, the individual substances may be present on the seed in different layers. In this case, the layers comprising a compound of the formula (I) and mixing components may optionally be separated by an intermediate layer. The invention also relates to seed in which a compound of the formula (I) and a mixing component have been applied as part of a coating or as a further layer or further layers in addition to a coating.

The invention further relates to seed which, after the treatment with a compound of the formula (I), is subjected to a film-coating process to prevent dust abrasion on the seed.

One of the advantages that occur when a compound of the formula (I) acts systemically is that the treatment of the seed protects not only the seed itself but also the plants resulting therefrom, after emergence, from animal pests. In this way, the immediate treatment of the crop at the time of sowing or shortly thereafter can be dispensed with.

A further advantage is that the treatment of the seed with a compound of the formula (I) can enhance germination and emergence of the treated seed.

It is likewise considered to be advantageous that compounds of the formula (I) can especially also be used for transgenic seed.

Furthermore, compounds of the formula (I) can be employed in combination with compositions of signalling technology, leading to better colonization by symbionts such as, for example, rhizobia, mycorrhizae and/or endophytic bacteria or fungi, and/or to optimized nitrogen fixation.

The compounds of the formula (I) are suitable for protection of seed of any plant variety which is used in agriculture, in the greenhouse, in forests or in horticulture. More particularly, this is the seed of cereals (for example wheat, barley, rye, millet and oats), maize, cotton, soya beans, rice, potatoes, sunflowers, coffee, tobacco, canola, oilseed rape, beets (for example sugar beets and fodder beets), peanuts, vegetables (for example tomatoes, cucumbers, beans, cruciferous vegetables, onions and lettuce), fruit plants, lawns and ornamental plants. Of particular significance is the treatment of the seed of cereals (such as wheat, barley, rye and oats), maize, soya beans, cotton, canola, oilseed rape, vegetables and rice.

As already mentioned above, the treatment of transgenic seed with a compound of the formula (I) is also of particular importance. This involves the seed of plants which generally contain at least one heterologous gene which controls the expression of a polypeptide having insecticidal and/or nematicidal properties in particular. The heterologous genes in transgenic seed may originate from microorganisms such as Bacillus, Rhizobium, Pseudomonas, Serratia, Trichoderma, Clavibacter, Glomus or Gliocladium. The present invention is particularly suitable for treatment of transgenic seed which comprises at least one heterologous gene originating from Bacillus sp. The heterologous gene is more preferably derived from Bacillus thuringiensis.

In the context of the present invention, the compound of the formula (I) is applied to the seed. The seed is preferably treated in a state in which it is sufficiently stable for no damage to occur in the course of treatment. In general, the seed can be treated at any time between harvest and sowing. It is customary to use seed which has been separated from the plant and freed from cobs, shells, stalks, coats, hairs or the flesh of the fruits. For example, it is possible to use seed which has been harvested, cleaned and dried

down to a moisture content which allows storage. Alternatively, it is also possible to use seed which, after drying, has been treated with, for example, water and then dried again, for example priming. In the case of rice seed, it is also possible to use seed which has been soaked, for example in water, until it reaches a certain stage of the rice embryo ("pigeon breast stage") which results in stimulation of germination and more uniform emergence.

When treating the seed, care must generally be taken that the amount of the compound of the formula (I) applied to the seed and/or the amount of further additives is chosen in such a way that the germination of the seed is not adversely affected, or that the resulting plant is not damaged. This has to be ensured particularly in the case of active compounds which can exhibit phytotoxic effects at certain application rates.

In general, the compounds of the formula (I) are applied to the seed in the form of a suitable formulation. Suitable formulations and processes for seed treatment are known to the person skilled in the art.

The compounds of the formula (I) can be converted to the customary seed-dressing formulations, such as solutions, emulsions, suspensions, powders, foams, slurries or other coating compositions for seed, and also ULV formulations.

These formulations are prepared in a known manner, by mixing the compounds of the formula (I) with customary additives, for example customary extenders and solvents or diluents, dyes, wetting agents, dispersants, emulsifiers, antifoams, preservatives, secondary thickeners, adhesives, gibberellins, and also water.

Dyes which may be present in the seed-dressing formulations usable in accordance with the invention are all dyes which are customary for such purposes. It is possible to use either pigments, which are sparingly soluble in water, or dyes, which are soluble in water. Examples include the dyes known by the names Rhodamine B, C.I. Pigment Red 112 and C.I. Solvent Red 1.

Useful wetting agents which may be present in the seed-dressing formulations usable in accordance with the invention are all substances which promote wetting and which are customary for the formulation of active agrochemical ingredients. Usable with preference are alkyl naphthalenesulfonates, such as diisopropyl or diisobutyl naphthalenesulfonates.

Suitable dispersants and/or emulsifiers which may be present in the seed-dressing formulations usable in accordance with the invention are all nonionic, anionic and cationic dispersants customary for the formulation of active agrochemical ingredients. Nonionic or anionic dispersants or mixtures of nonionic or anionic dispersants can be used with preference. Suitable nonionic dispersants especially include ethylene oxide/propylene oxide block polymers, alkylphenol polyglycol ethers and tristyrylphenol

polyglycol ethers, and the phosphated or sulfated derivatives thereof. Suitable anionic dispersants are especially lignosulfonates, polyacrylic acid salts and arylsulfonate-formaldehyde condensates.

Antifoams which may be present in the seed-dressing formulations usable in accordance with the invention are all foam-inhibiting substances customary for the formulation of active agrochemical ingredients. Silicone antifoams and magnesium stearate can be used with preference.

Preservatives which may be present in the seed-dressing formulations usable in accordance with the invention are all substances usable for such purposes in agrochemical compositions. Examples include dichlorophene and benzyl alcohol hemiformal.

Secondary thickeners which may be present in the seed-dressing formulations usable in accordance with the invention are all substances which can be used for such purposes in agrochemical compositions. Preferred examples include cellulose derivatives, acrylic acid derivatives, xanthan, modified clays and finely divided silica.

Useful stickers which may be present in the seed-dressing formulations usable in accordance with the invention are all customary binders usable in seed-dressing products. Preferred examples include polyvinylpyrrolidone, polyvinyl acetate, polyvinyl alcohol and tylose.

Gibberellins which may be present in the seed-dressing formulations usable in accordance with the invention are preferably the gibberellins A1, A3 (= gibberellic acid), A4 and A7; particular preference is given to using gibberellic acid. The gibberellins are known (cf. R. Wegler "Chemie der Pflanzenschutz- und Schädlingsbekämpfungsmittel", vol. 2, Springer Verlag, 1970, pp. 401-412).

The seed-dressing formulations usable in accordance with the invention can be used to treat a wide variety of different kinds of seed, either directly or after prior dilution with water. For instance, the concentrates or the preparations obtainable therefrom by dilution with water can be used to dress the seed of cereals, such as wheat, barley, rye, oats and triticale, and also the seed of maize, rice, oilseed rape, peas, beans, cotton, sunflowers, soya beans and beets, or else a wide variety of different vegetable seed. The seed-dressing formulations usable in accordance with the invention, or the dilute use forms thereof, can also be used to dress seed of transgenic plants.

For the treatment of seed with the seed-dressing formulations usable in accordance with the invention, or the use forms prepared therefrom through the addition of water, all mixing units usable customarily for the seed dressing are useful. Specifically, the procedure in seed dressing is to place the seed into a mixer in batchwise or continuous operation, to add the particular desired amount of seed-dressing formulations, either as such or after prior dilution with water, and to mix until the formulation is distributed homogeneously on the seed. If appropriate, this is followed by a drying operation.

The application rate of the seed dressing formulations usable in accordance with the invention can be varied within a relatively wide range. It is guided by the particular content of the compounds of the formula (I) in the formulations and by the seed. The application rates of the compound of the formula (I) are generally between 0.001 and 50 g per kilogram of seed, preferably between 0.01 and 15 g per kilogram of seed.

Animal health

In the animal health field, i.e. the field of veterinary medicine, the compounds of the formula (I) are active against animal parasites, in particular ectoparasites or endoparasites. The term "endoparasite" includes especially helminths and protozoa, such as coccidia. Ectoparasites are typically and preferably arthropods, especially insects or acarids.

In the field of veterinary medicine, the compounds of the formula (I) having favourable endotherm toxicity are suitable for controlling parasites which occur in animal breeding and animal husbandry in livestock, breeding animals, zoo animals, laboratory animals, experimental animals and domestic animals. They are active against all or specific stages of development of the parasites.

Agricultural livestock include, for example, mammals, such as sheep, goats, horses, donkeys, camels, buffalo, rabbits, reindeer, fallow deer and especially cattle and pigs; or poultry such as turkeys, ducks, geese and especially chickens; or fish or crustaceans, for example in aquaculture; or, as the case may be, insects such as bees.

Domestic animals include, for example, mammals, such as hamsters, guinea pigs, rats, mice, chinchillas, ferrets, and particularly dogs, cats, caged birds; reptiles, amphibians or aquarium fish.

In a specific embodiment, the compounds of the formula (I) are administered to mammals.

In another specific embodiment, the compounds of the formula (I) are administered to birds, namely caged birds or particularly poultry.

Use of the compounds of the formula (I) for the control of animal parasites is intended to reduce or prevent illness, cases of death and reductions in performance (in the case of meat, milk, wool, hides, eggs, honey and the like), such that more economical and simpler animal husbandry is enabled and better animal well-being is achievable.

In relation to the field of animal health, the term "control" or "controlling" in the present context means that the compounds of the formula (I) are effective in reducing the incidence of the particular parasite in an animal infected with such parasites to an innocuous degree. More specifically, "controlling" in the present context means that the compounds of the formula (I) kill the respective parasite, inhibit its growth, or inhibit its proliferation.

The arthropods include, for example, but are not limited to,

from the order of Anoplurida, for example, Haematopinus spp., Linognathus spp., Pediculus spp., Phtirus spp. and Solenopotes spp.;

from the order of Mallophagida and the suborders Amblycerina and Ischnocerina, for example, Bovicola spp., Damalina spp., Felicola spp.; Lepikentron spp., Menopon spp., Trichodectes spp., Trimenopon spp., Trinoton spp., Werneckiella spp;

from the order of Diptera and the suborders Nematocerina and Brachycerina, for example, Aedes spp., Anopheles spp., Atylotus spp., Braula spp., Calliphora spp., Chrysomyia spp., Chrysops spp., Culex spp., Culicoides spp., Eusimulium spp., Fannia spp., Gasterophilus spp., Glossina spp., Haematobia spp., Haematopota spp., Hippobosca spp., Hybomitra spp., Hydrotaea spp., Hypoderma spp., Lipoptena spp., Lucilia spp., Lutzomyia spp., Melophagus spp., Morellia spp., Musca spp., Odagmia spp., Oestrus spp., Philipomyia spp., Phlebotomus spp., Rhinoestrus spp., Sarcophaga spp., Simulium spp., Stomoxys spp., Tabanus spp., Tipula spp., Wilhelmia spp., Wohlfahrtia spp.;

from the order of Siphonapterida, for example, Ceratophyllus spp., Ctenocephalides spp., Pulex spp., Tunga spp., Xenopsylla spp.;

from the order of heteropterida, for example, Cimex spp., Panstrongylus spp., Rhodnius spp., Triatoma spp.; and also nuisance and hygiene pests from the order Blattarida.

In addition, in the case of the arthropods, mention should be made by way of example, without limitation, of the following Acari:

from the subclass of Acari (Acarina) and the order of Metastigmata, for example from the family of Argasidae such as Argas spp., Ornithodorus spp., Otobius spp., from the family of Ixodidae such as Amblyomma spp., Dermacentor spp., Haemaphysalis spp., Hyalomma spp., Ixodes spp., Rhipicephalus (Boophilus) spp., Rhipicephalus spp. (the original genus of multi-host ticks); from the order of Mesostigmata such as Dermanyssus spp., Ornithonyssus spp., Pneumonyssus spp., Raillietia spp., Sternostoma spp., Tropilaelaps spp., Varroa spp.; from the order of the Actinedida (Prostigmata), for example, Acarapis spp., Cheyletiella spp., Demodex spp., Listrophorus spp., Myobia spp., Neotrombicula spp., Ornithocheyletia spp., Psorergates spp., Trombicula spp.; and from the order of the Acaridida (Astigmata), for example, Acarus spp., Caloglyphus spp., Chorioptes spp., Cytodites spp., Hypodectes spp., Knemidocoptes spp., Laminosioptes spp., Notoedres spp., Otodectes spp., Psoroptes spp., Pterolichus spp., Sarcoptes spp., Trixacarus spp., Tyrophagus spp.

Examples of parasitic protozoa include, but are not limited to:

Mastigophora (Flagellata), such as:

Metamonada: from the order of Diplomonadida, for example, Giardia spp., Spironucleus spp.

Parabasala: from the order of Trichomonadida, for example, Histomonas spp., Pentatrichomonas spp., Tetratrichomonas spp., Trichomonas spp., Tritrichomonas spp.

Euglenozoa: from the order of Trypanosomatida, for example, Leishmania spp., Trypanosoma spp.

Sarcomastigophora (Rhizopoda) such as Entamoebidae, for example, Entamoeba spp., Centramoebidae, for example Acanthamoeba sp., Euamoebidae, e.g. Hartmanella sp.

Alveolata such as Apicomplexa (Sporozoa): e.g. Cryptosporidium spp.; from the order of Eimeriida, for example, Besnoitia spp., Cystoisospora spp., Eimeria spp., Hammondia spp., Isospora spp., Neospora spp., Sarcocystis spp., Toxoplasma spp.; from the order of Adeleida, for example, Hepatozoon spp., Klossiella spp.; from the order of Haemosporida, for example, Leucocytozoon spp., Plasmodium spp.; from the order of Piroplasmida, for example, Babesia spp., Ciliophora spp., Echinozoon spp., Theileria spp.; from the order of Vesibuliferida, for example, Balantidium spp., Buxtonella spp.

Microspora such as Encephalitozoon spp., Enterocytozoon spp., Globidium spp., Nosema spp., and also, for example, Myxozoa spp.

The helminths that are pathogenic to humans or animals include, for example, Acanthocephala, nematodes, Pentastoma and Platyhelminthes (e.g. Monogenea, cestodes and trematodes).

Illustrative helminths include, but are not limited to:

Monogenea: e.g. Dactylogyrus spp., Gyrodactylus spp., Microbothrium spp., Polystoma spp., Troglecephalus spp.;

Cestodes: from the order of Pseudophyllidea, for example: Bothridium spp., Diphyllobothrium spp., Diplogonoporus spp., Ichthyobothrium spp., Ligula spp., Schistocephalus spp., Spirometra spp.

From the order of Cyclophyllida, for example: Andyra spp., Anoplocephala spp., Avitellina spp., Bertiella spp., Cittotaenia spp., Davainea spp., Diorchis spp., Diplopylidium spp., Dipylidium spp., Echinococcus spp., Echinocotyle spp., Echinolepis spp., Hydatigera spp., Hymenolepis spp., Joyeuxiella spp., Mesocestoides spp., Moniezia spp., Paranoplocephala spp., Raillietina spp., Stilesia spp., Taenia spp., Thysaniezia spp., Thysanosoma spp.

Trematodes: from the class of Digenea, for example: Austrobilharzia spp., Brachylaima spp., Calicophoron spp., Catatropis spp., Clonorchis spp. Collyriclum spp., Cotylophoron spp., Cyclocoelum spp., Dicrocoelium spp., Diplostomum spp., Echinochasmus spp., Echinoparyphium spp., Echinostoma spp., Eurytrema spp., Fasciola spp., Fasciolides spp., Fasciolopsis spp., Fischoederius spp., Gastrothylacus

spp., Gigantobilharzia spp., Gigantocotyle spp., Heterophyes spp., Hypoderaeum spp., Leucochloridium spp., Metagonimus spp., Metorchis spp., Nanophyetus spp., Notocotylus spp., Opisthorchis spp., Ornithobilharzia spp., Paragonimus spp., Paramphistomum spp., Plagiorchis spp., Posthodiplostomum spp., Prosthogonimus spp., Schistosoma spp., Trichobilharzia spp., Troglotrema spp., Typhlocoelum spp.

Nematodes: from the order of Trichinellida, for example: Capillaria spp., Trichinella spp., Trichomosoides spp., Trichuris spp.

From the order of Tylenchida, for example: Micronema spp., Parastrangyloides spp., Strongyloides spp.

From the order of Rhabditina, for example: Aelurostrongylus spp., Amidostomum spp., Ancylostoma spp., Angiostrongylus spp., Bronchonema spp., Bunostomum spp., Chabertia spp., Cooperia spp., Cooperioides spp., Crenosoma spp., Cyathostomum spp., Cyclococercus spp., Cyclodontostomum spp., Cylicocyclus spp., Cylicostephanus spp., Cylindropharynx spp., Cystocaulus spp., Dictyocaulus spp., Elaphostrongylus spp., Filaroides spp., Globocephalus spp., Graphidium spp., Gyalocephalus spp., Haemonchus spp., Heligmosomoides spp., Hyostrongylus spp., Marshallagia spp., Metastrongylus spp., Muellerius spp., Necator spp., Nematodirus spp., Neostrongylus spp., Nippostrongylus spp., Obeliscoides spp., Oesophagodontus spp., Oesophagostomum spp., Ollulanus spp.; Ornithostrongylus spp., Oslerus spp., Ostertagia spp., Paracooperia spp., Paracrenosoma spp., Parafilaroides spp., Parelaphostrongylus spp., Pneumocaulus spp., Pneumostrongylus spp., Poteriostomum spp., Protostrongylus spp., Spicocaulus spp., Stephanurus spp., Strongylus spp., Syngamus spp., Teladorsagia spp., Trichonema spp., Trichostrongylus spp., Triodontophorus spp., Troglostrongylus spp., Uncinaria spp.

From the order of Spirurida, for example: Acanthocheilonema spp., Anisakis spp., Ascaridia spp.; Ascaris spp., Ascarops spp., Aspiculuris spp., Baylisascaris spp., Brugia spp., Cercopithifilaria spp., Crassicauda spp., Dipetalonema spp., Dirofilaria spp., Dracunculus spp.; Draschia spp., Enterobius spp., Filaria spp., Gnathostoma spp., Gongylonema spp., Habronema spp., Heterakis spp.; Litomosoides spp., Loa spp., Onchocerca spp., Oxyuris spp., Parabronema spp., Parafilaria spp., Parascaris spp., Passalurus spp., Physaloptera spp., Probstmayria spp., Pseudofilaria spp., Setaria spp., Skjrabinema spp., Spirocerca spp., Stephanofilaria spp., Strongyluris spp., Syphacia spp., Thelazia spp., Toxascaris spp., Toxocara spp., Wuchereria spp.

Acanthocephala: from the order of Oligacanthorhynchida, for example: Macracanthorhynchus spp., Prosthenorchis spp.; from the order of Moniliformida, for example: Moniliformis spp.

From the order of Polymorphida, for example: Filicollis spp.; from the order of Echinorhynchida, for example Acanthocephalus spp., Echinorhynchus spp., Leptorhynchoides spp.

Pentastoma: from the order of Porocephalida, for example, Linguatula spp.

In the veterinary field and in animal husbandry, the compounds of the formula (I) are administered by methods generally known in the art, such as via the enteral, parenteral, dermal or nasal route in the form of suitable preparations. Administration may be prophylactic, metaphylactic or therapeutic.

Thus, one embodiment of the present invention relates to the compounds of the formula (I) for use as a medicament.

A further aspect relates to the compounds of the formula (I) for use as an antiendoparasitic agent.

A further specific aspect of the invention relates to the compounds of the formula (I) for use as an antithelminthic agent, especially for use as a nematicide, platyhelminthicide, acanthocephalicide or pentastomicide.

A further specific aspect of the invention relates to the compounds of the formula (I) for use as an antiprotozoic agent.

A further aspect relates to the compounds of the formula (I) for use as an antiectoparasitic agent, especially an arthropodicide, very particularly an insecticide or an acaricide.

Further aspects of the invention are veterinary medicine formulations comprising an effective amount of at least one compound of the formula (I) and at least one of the following: a pharmaceutically acceptable excipient (e.g. solid or liquid diluents), a pharmaceutically acceptable auxiliary (e.g. surfactants), especially a pharmaceutically acceptable excipient used conventionally in veterinary medicine formulations and/or a pharmaceutically acceptable auxiliary conventionally used in veterinary medicine formulations.

A related aspect of the invention is a method for production of a veterinary medicine formulation as described here, which comprises the step of mixing at least one compound of the formula (I) with pharmaceutically acceptable excipients and/or auxiliaries, especially with pharmaceutically acceptable excipients used conventionally in veterinary medicine formulations and/or auxiliaries used conventionally in veterinary medicine formulations.

Another specific aspect of the invention is veterinary medicine formulations selected from the group of ectoparasiticidal and endoparasiticidal formulations, especially selected from the group of anthelmintic, antiprotozoic and arthropodicidal formulations, very particularly selected from the group of nematicidal, platyhelminthicidal, acanthocephalicidal, pentastomicidal, insecticidal and acaricidal formulations, according to the aspects mentioned, and methods for production thereof.

Another aspect relates to a method for treatment of a parasitic infection, especially an infection caused by a parasite selected from the group of the ectoparasites and endoparasites mentioned here, by use of an

effective amount of a compound of the formula (I) in an animal, especially a nonhuman animal, having a need therefor.

Another aspect relates to a method for treatment of a parasitic infection, especially an infection caused by a parasite selected from the group of the ectoparasites and endoparasites mentioned here, by use of a veterinary medicine formulation as defined here in an animal, especially a nonhuman animal, having a need therefor.

Another aspect relates to the use of the compounds of the formula (I) in the treatment of a parasite infection, especially an infection caused by a parasite selected from the group of the ectoparasites and endoparasites mentioned here, in an animal, especially a nonhuman animal.

In the present context of animal health or veterinary medicine, the term "treatment" includes prophylactic, metaphylactic and therapeutic treatment.

In a particular embodiment, in this way, mixtures of at least one compound of the formula (I) with other active compounds, especially with endo- and ectoparasiticides, are provided for the field of veterinary medicine.

In the field of animal health, "mixture" means not just that two (or more) different active compounds are formulated in a common formulation and are correspondingly employed together, but also relates to products comprising formulations separated for each active compound. Accordingly, when more than two active compounds are to be employed, all active compounds can be formulated in a common formulation or all active compounds can be formulated in separate formulations; likewise conceivable are mixed forms in which some of the active compounds are formulated together and some of the active compounds are formulated separately. Separate formulations allow the separate or successive application of the active compounds in question.

The active compounds specified here by their "common names" are known and are described, for example, in the "Pesticide Manual" (see above) or can be searched for on the Internet (e.g.: http://www.alanwood.net/pesticides).

Illustrative active compounds from the group of the ectoparasiticides as mixing components include, without any intention that this should constitute a restriction, the insecticides and acaricides listed in detail above. Further usable active compounds are listed below in accordance with the abovementioned classification based on the current IRAC Mode of Action Classification Scheme: (1) acetylcholinesterase (AChE) inhibitors; (2) GABA-gated chloride channel blockers; (3) sodium channel modulators; (4) nicotinic acetylcholine receptor (nAChR) competitive modulators; (5) nicotinic acetylcholine receptor (nAChR) allosteric modulators; (6) glutamate-gated chloride channel (GluCl) allosteric modulators; (7) juvenile hormone mimetics; (8) miscellaneous non-specific (multi-site) inhibitors; (9) chordotonal organ modulators; (10) mite growth inhibitors; (12) inhibitors of mitochondrial ATP synthase, such as ATP disruptors; (13) uncouplers of oxidative phosphorylation via disruption of the proton gradient; (14)

nicotinic acetylcholine receptor channel blockers; (15) inhibitors of chitin biosynthesis, type 0; (16) inhibitors of chitin biosynthesis, type 1; (17) moulting disruptors (especially in Diptera); (18) ecdysone receptor agonists; (19) octopamine receptor agonists; (21) mitochondrial complex I electron transport inhibitors; (25) mitochondrial complex II electron transport inhibitors; (20) mitochondrial complex III electron transport inhibitors; (22) voltage-dependent sodium channel blockers; (23) inhibitors of acetyl CoA carboxylase; (28) ryanodine receptor modulators;

active compounds having unknown or non-specific mechanisms of action, e.g. fentrifanil, fenoxacrim, cycloprene, chlorobenzilate, chlordimeform, flubenzimin, dicyclanil, amidoflumet, quinomethionat, triarathene, clothiazoben, tetrasul, potassium oleate, petroleum, metoxadiazone, gossyplur, flutenzine, brompropylate, cryolite;

compounds from other classes, for example butacarb, dimetilan, cloethocarb, phosphocarb, pirimiphos(-ethyl), parathion(-ethyl), methacrifos, isopropyl o-salicylate, trichlorfon, sulprofos, propaphos, sebufos, pyridathion, prothoate, dichlofenthion, demeton-S-methyl sulfone, isazofos, cyanofenphos, dialifos, carbophenothion, autathiofos, aromfenvinfos(-methyl), azinphos(-ethyl), chlorpyrifos(-ethyl), fosmethilan, iodofenphos, dioxabenzofos, formothion, fonofos, flupyrazofos, fensulfothion, etrimfos;

organochlorine compounds, for example camphechlor, lindane, heptachlor; or phenylpyrazoles, e.g. acetoprole, pyrafluprole, pyriprole, vaniliprole, sisapronil; or isoxazolines, e.g. sarolaner, afoxolaner, lotilaner, fluralaner;

pyrethroids, e.g. (cis-, trans-)metofluthrin, profluthrin, flufenprox, flubrocythrinate, fubfenprox, fenfluthrin, protrifenbut, pyresmethrin, RU15525, terallethrin, cis-resmethrin, heptafluthrin, bioethanomethrin, biopermethrin, fenpyrithrin, cis-cypermethrin, cis-permethrin, clocythrin, cyhalothrin (lambda-), chlovaporthrin, or halogenated hydrocarbon compounds (HCHs),

neonicotinoids, e.g. nithiazine

dicloromezotiaz, triflumezopyrim

macrocyclic lactones, e.g. nemadectin, ivermectin, latidectin, moxidectin, selamectin, eprinomectin, doramectin, emamectin benzoate; milbemycin oxime

triprene, epofenonane, diofenolan;

biologicals, hormones or pheromones, for example natural products, e.g. thuringiensin, codlemone or neem components

dinitrophenols, e.g. dinocap, dinobuton, binapacryl;

benzoylureas, e.g. fluazuron, penfluron,

amidine derivatives, e.g. chlormebuform, cymiazole, demiditraz

beehive varroa acaricides, for example organic acids, e.g. formic acid, oxalic acid.

Illustrative active compounds from the group of the endoparasiticides, as mixing components, include, but are not limited to, active anthelmintic ingredients and active antiprotozoic ingredients.

The active anthelmintic ingredients include, but are not limited to, the following active nematicidal, trematicidal and/or cestocidal ingredients:

from the class of the macrocyclic lactones, for example: eprinomectin, abamectin, nemadectin, moxidectin, doramectin, selamectin, lepimectin, latidectin, milbemectin, ivermectin, emamectin, milbemycin;

from the class of the benzimidazoles and probenzimidazoles, for example: oxibendazole, mebendazole, triclabendazole, thiophanate, parbendazole, oxfendazole, netobimin, fenbendazole, febantel, thiabendazole, cyclobendazole, cambendazole, albendazole sulfoxide, albendazole, flubendazole;

from the class of the depsipeptides, preferably cyclic depsipeptides, especially 24-membered cyclic depsipeptides, for example: emodepside, PF1022A;

from the class of the tetrahydropyrimidines, for example: morantel, pyrantel, oxantel;

from the class of the imidazothiazoles, for example: butamisole, levamisole, tetramisole;

from the class of the aminophenylamidines, for example: amidantel, deacylated amidantel (dAMD), tribendimidine;

from the class of the aminoacetonitriles, for example: monepantel;

from the class of the paraherquamides, for example: paraherquamide, derquantel;

from the class of the salicylanilides, for example: tribromsalan, bromoxanide, brotianide, clioxanide, closantel, niclosamide, oxyclozanide, rafoxanide;

from the class of the substituted phenols, for example: nitroxynil, bithionol, disophenol, hexachlorophene, niclofolan, meniclopholan;

from the class of the organophosphates, for example: trichlorfon, naphthalofos, dichlorvos/DDVP, crufomate, coumaphos, haloxon;

from the class of the piperazinones/quinolines, for example: praziquantel, epsiprantel;

from the class of the piperazines, for example: piperazine, hydroxyzine;

from the class of the tetracyclines, for example: tetracycline, chlorotetracycline, doxycycline, oxytetracycline, rolitetracycline;

from various other classes, for example: bunamidine, niridazole, resorantel, omphalotin, oltipraz, nitroscanate, nitroxynil, oxamniquin, mirasan, miracil, lucanthon, hycanthon, hetolin, emetin, diethylcarbamazine, dichlorophen, diamfenetide, clonazepam, bephenium, amoscanate, clorsulon.

Active antiprotozoic ingredients include, but are not limited to, the following active compounds:

from the class of the triazines, for example: diclazuril, ponazuril, letrazuril, toltrazuril;

from the class of polyether ionophores, for example: monensin, salinomycin, maduramicin, narasin;

from the class of the macrocyclic lactones, for example: milbemycin, erythromycin;

from the class of the quinolones, for example: enrofloxacin, pradofloxacin;

from the class of the quinines, for example: chloroquine;

from the class of the pyrimidines, for example: pyrimethamine;

from the class of the sulfonamides, for example: sulfaquinoxaline, trimethoprim, sulfaclozin;

from the class of the thiamines, for example: amprolium;

from the class of the lincosamides, for example: clindamycin;

from the class of the carbanilides, for example: imidocarb;

from the class of the nitrofurans, for example: nifurtimox;

from the class of the quinazolinone alkaloids, for example: halofuginone;

from various other classes, for example: oxamniquin, paromomycin;

from the class of the vaccines or antigens from microorganisms, for example: Babesia canis rossi, Eimeria tenella, Eimeria praecox, Eimeria necatrix, Eimeria mitis, Eimeria maxima, Eimeria brunetti, Eimeria acervulina, Babesia canis vogeli, Leishmania infantum, Babesia canis canis, Dictyocaulus viviparus.

All the mixing components mentioned, as the case may be, may also form salts with suitable bases or acids if they are capable of doing so on the basis of their functional groups.

Vector control

The compounds of the formula (I) can also be used in vector control. In the context of the present invention, a vector is an arthropod, especially an insect or arachnid, capable of transmitting pathogens, for example viruses, worms, single-cell organisms and bacteria, from a reservoir (plant, animal, human, etc.) to a host. The pathogens can be transmitted either mechanically (for example trachoma by non-stinging flies) onto a host or after injection into a host (for example malaria parasites by mosquitoes).

Examples of vectors and the diseases or pathogens they transmit are:

1) Mosquitoes

- Anopheles: malaria, filariasis;

- Culex: Japanese encephalitis, filariasis, other viral diseases, transmission of other worms;

- Aedes: yellow fever, dengue fever, further viral disorders, filariasis;

- Simuliidae: transmission of worms, especially Onchocerca volvulus;

- Psychodidae: transmission of leishmaniasis

2) Lice: skin infections, epidemic typhus;

3) Fleas: plague, endemic typhus, tapeworms;

4) Flies: sleeping sickness (trypanosomiasis); cholera, other bacterial diseases;

5) Mites: acariosis, epidemic typhus, rickettsialpox, tularaemia, Saint Louis encephalitis, tick-borne encephalitis (TBE), Crimean-Congo haemorrhagic fever, borreliosis;

6) Ticks: borellioses such as Borrelia bungdorferi sensu lato., Borrelia duttoni, tick-borne encephalitis, Q fever (Coxiella burnetii), babesioses (Babesia canis canis), ehrlichiosis.

Examples of vectors in the context of the present invention are insects, for example aphids, flies, leafhoppers or thrips, which can transmit plant viruses to plants. Other vectors capable of transmitting plant viruses are spider mites, lice, beetles and nematodes.

Further examples of vectors in the context of the present invention are insects and arachnids such as mosquitoes, especially of the genera Aedes, Anopheles, for example A. gambiae, A. arabiensis, A.

funestus, A. dirus (malaria) and Culex, Psychodidae such as Phlebotomus, Lutzomyia, lice, fleas, flies, mites and ticks, which can transmit pathogens to animals and/or humans.

Vector control is also possible if the compounds of the formula (I) are resistance-breaking.

Compounds of the formula (I) are suitable for use in the prevention of diseases and/or pathogens transmitted by vectors. Thus, a further aspect of the present invention is the use of compounds of the formula (I) for vector control, for example in agriculture, in horticulture, in forests, in gardens and in leisure facilities, and also in the protection of materials and stored products.

Protection of industrial materials

The compounds of the formula (I) are suitable for protecting industrial materials against attack or destruction by insects, for example from the orders of Coleoptera, Hymenoptera, Isoptera, Lepidoptera, Psocoptera and Zygentoma.

Industrial materials in the present context are understood to mean inanimate materials, such as preferably plastics, adhesives, sizes, papers and cards, leather, wood, processed wood products and coating compositions. The use of the invention for protection of wood is particularly preferred.

In a further embodiment, the compounds of the formula (I) are used together with at least one further insecticide and/or at least one fungicide.

In a further embodiment, the compounds of the formula (I) take the form of a ready-to-use pesticide, meaning that they can be applied to the material in question without further modifications. Useful further insecticides or fungicides especially include those mentioned above.

Surprisingly, it has also been found that the compounds of the formula (I) can be employed for protecting objects which come into contact with saltwater or brackish water, in particular hulls, screens, nets, buildings, moorings and signalling systems, against fouling. It is equally possible to use the compounds of the formula (I), alone or in combinations with other active compounds, as antifouling agents.

Control of animal pests in the hygiene sector

The compounds of the formula (I) are suitable for controlling animal pests in the hygiene sector. More particularly, the invention can be used in the domestic protection sector, in the hygiene protection sector and in the protection of stored products, particularly for control of insects, arachnids, ticks and mites encountered in enclosed spaces, for example dwellings, factory halls, offices, vehicle cabins, animal breeding facilities. For controlling animal pests, the compounds of the formula (I) are used alone or in combination with other active compounds and/or auxiliaries. They are preferably used in domestic

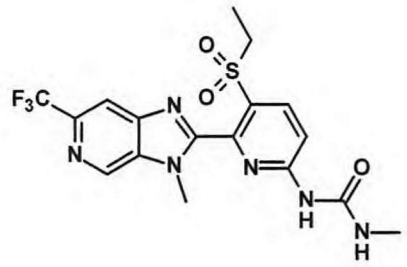
insecticide products. The compounds of the formula (I) are effective against sensitive and resistant species, and against all developmental stages.

These pests include, for example, pests from the class Arachnida, from the orders Scorpiones, Araneae and Opiliones, from the classes Chilopoda and Diplopoda, from the class Insecta the order Blattodea, from the orders Coleoptera, Dermaptera, Diptera, Heteroptera, Hymenoptera, Isoptera, Lepidoptera, Phthiraptera, Psocoptera, Saltatoria or Orthoptera, Siphonaptera and Zygentoma and from the class Malacostraca the order Isopoda.

Application is effected, for example, in aerosols, unpressurized spray products, for example pump and atomizer sprays, automatic fogging systems, foggers, foams, gels, evaporator products with evaporator tablets made of cellulose or plastic, liquid evaporators, gel and membrane evaporators, propeller-driven evaporators, energy-free, or passive, evaporation systems, moth papers, moth bags and moth gels, as granules or dusts, in baits for spreading or bait stations.

Preparation examples:

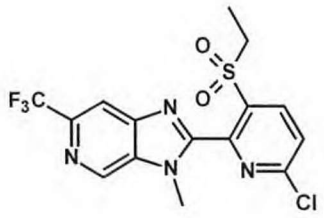
1-[5-Ethylsulfonyl-6-[3-methyl-6-(trifluoromethyl)imidazo[4,5-c]pyridin-2-yl]-2-pyridyl]-3-methylurea (I-4)



Under argon, 346 mg (0.68 mmol) of 2-(6-chloro-3-ethylsulfonyl-2-pyridyl)-3-methyl-6-(trifluoromethyl)imidazo[4,5-c]pyridine were dissolved in 20 ml of degassed dioxane, 62.5 mg (0.81 mmol) of N-methylurea, 333 mg (1.02 mmol) of caesium carbonate, 39.4 mg (0.06 mmol) of 4,5-bis(diphenylphosphine)-9,9-dimethylxanthene (xanthphos) and 31.2 mg (0.03 mmol) of tris(dibenzylideneacetone)dipalladium(0) were added and the mixture was stirred at 80°C for 3 h. The reaction mixture was then filtered through a silica gel cartridge rinsing with ethyl acetate. The mother liquor was washed with sodium chloride solution and dried over sodium sulfate, and the solvent was then distilled off under reduced pressure. The residue was purified by column chromatography purification on silica gel with a cyclohexane ethyl acetate mixture (6:4) as mobile phase.

(logP (neutral): 1.83; MH^+: 443; ^{1}H-NMR(400 MHz, D_6-DMSO) δ ppm: 1.16 (t, 3H), 2.70 (d, 3H), 3.61 (q, 2H), 3.87 (s, 3H), 6.94 (m, 1H), 8.12 (d, 1H), 8.28 (s, 1H), 8.34 (d, 1H), 9.27 (s, 1H), 10.06 (s, 1H).

2-(6-Chloro-3-ethylsulfonyl-2-pyridyl)-3-methyl-6-(trifluoromethyl)imidazo[4,5-c]pyridine

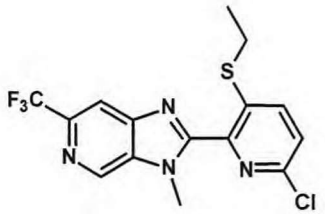


900 mg (2.41 mmol) of 2-(6-chloro-3-ethylsulfanyl-2-pyridyl)-3-methyl-6-(trifluoromethyl)imidazo[4,5-c]pyridine were dissolved in 50 ml of dichloromethane, 555.6 mg (12.0 mmol) of formic acid and 1.64 g (16.8 mmol) of 35% strength hydrogen peroxide were added at room temperature and the mixture was then stirred at room temperature for 5 h. The mixture was diluted with water and sodium bisulfite solution was added, the mixture was stirred for 1 h and saturated sodium hydrogencarbonate solution was then added. The organic phase was separated off, the aqueous phase was extracted twice with dichloromethane and the combined organic phases were then freed of the solvent under reduced pressure. The residue was purified by column chromatography purification by means of preparative HPLC with a water/acetonitrile

gradient as mobile phase.

(logP (neutral): 2.54; MH^+: 405; ^{1}H-NMR(400 MHz, D_6-DMSO) δ ppm: 1.20 (t, 3H), 3.77 (q, 2H), 3.91 (s, 3H), 8.13 (d, 1H), 8.32 (s, 1H), 8.56 (d, 1H), 9.30 (s, 1H).

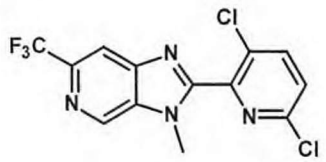
2-(6-Chloro-3-ethylsulfanyl-2-pyridyl)-3-methyl-6-(trifluoromethyl)imidazo[4,5-c]pyridine



4.00 g (10.7 mmol) of 2-(3,6-dichloro-2-pyridyl)-3-methyl-6-(trifluoromethyl)imidazo[4,5-c]pyridine were dissolved in 60 ml of tetrahydrofuran, 446 mg (11.1 mmol) of sodium hydride were added at -5°C and the mixture was stirred at 0°C for 30 minutes. 733 mg (11.8 mmol) ethanethiol were then added dropwise over 30 minutes at -5°C, the cooling bath was removed and the mixture was stirred at room temperature for 2 h. The reaction mixture was hydrolysed with water, the organic phase was separated off and the aqueous phase was extracted twice with ethyl acetate. The organic phases were combined, washed with sodium chloride solution and dried over sodium sulfate, and the solvent was then distilled off under reduced pressure. The residue is purified by trituration with methyl tert-butyl ketone / dichloromethane 25:1.

(logP (neutral): 3.06; MH^+: 373; ^{1}H-NMR(400 MHz, CD3CN) δ ppm: 1.25 (t, 3H), 2.98 (q, 2H), 3.98 (s, 3H), 7.56 (d, 1H), 7.95 (d, 1H), 8.15 (s, 1H), 9.06 (s, 1H).

2-(3,6-Dichloro-2-pyridyl)-3-methyl-6-(trifluoromethyl)imidazo[4,5-c]pyridine

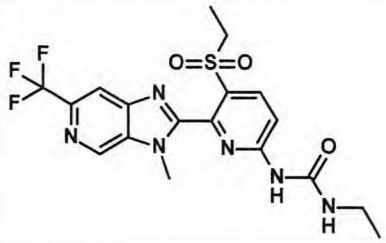
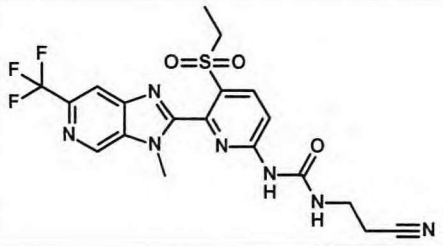
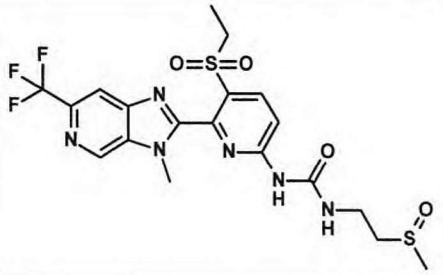
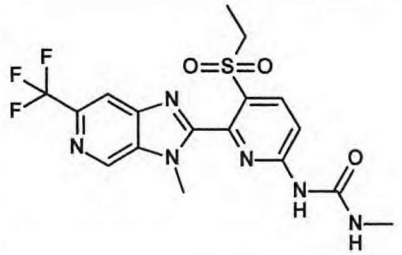
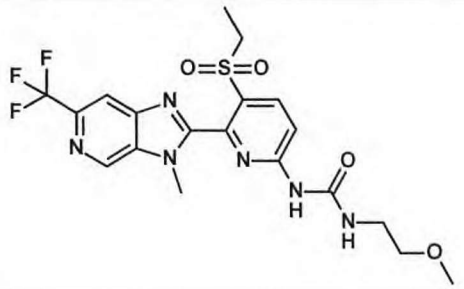


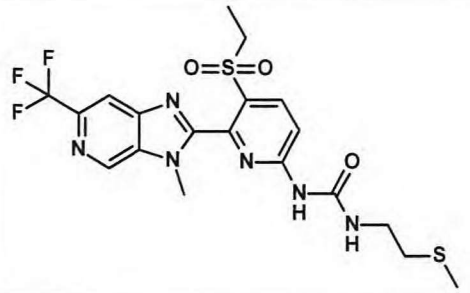
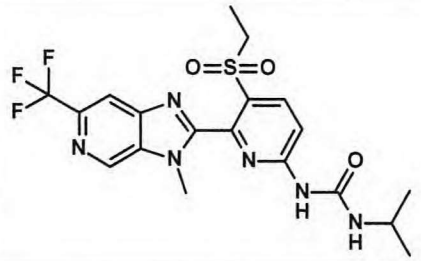
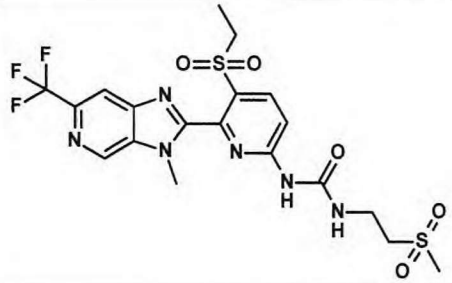
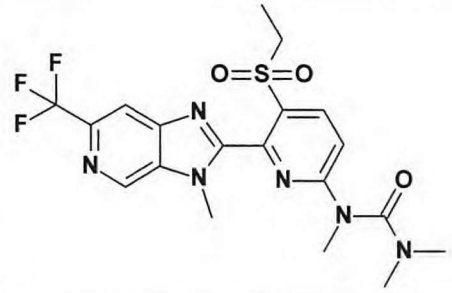
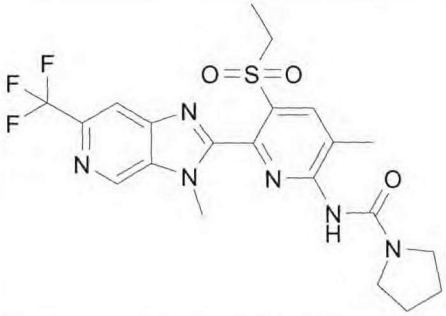
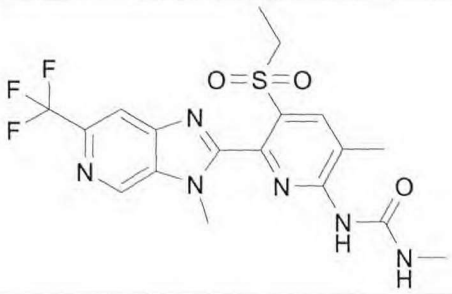
20 g (104.6 mmol) of N^3-methyl-6-(trifluoromethyl)pyridine-3,4-diamine, 25.11 g (130.8 mmol) of 3,6-dichloropyridine-2-carboxylic acid and 20.06 g (104.6 mmol) of 1-(3-dimethylaminopropyl)-3-ethylcarbodiimide hydrochloride (EDCI) were stirred in 200 ml of pyridine at 120°C for 8 h. The reaction mixture was freed of solvent under reduced pressure, water was added and the mixture was extracted three times with ethyl acetate. The organic phases were combined and dried over sodium sulfate, and the solvent was then distilled off under reduced pressure. The residue was purified by column chromatography using, as mobile phase, a cyclohexane / ethyl acetate gradient.

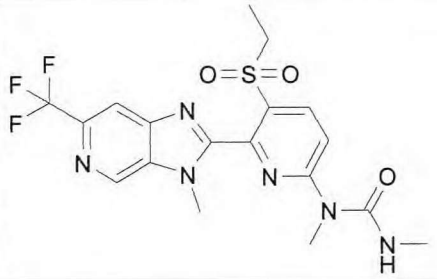
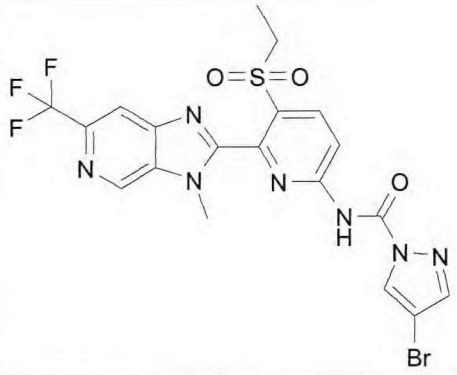
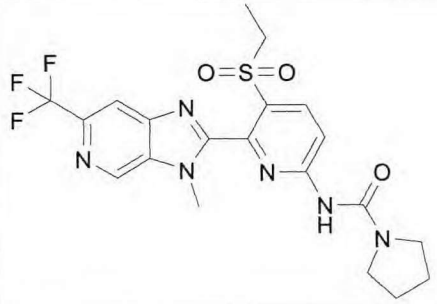
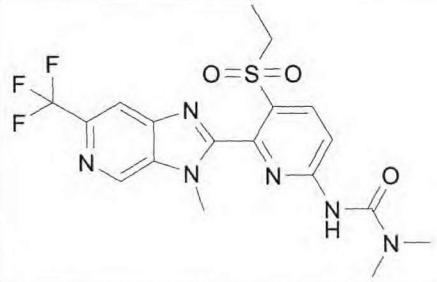
(logP (neutral): 2.81; MH^+: 347; ^{1}H-NMR(400 MHz, D_6-DMSO) δ ppm: 3.99 (s, 3H), 7.89 (d, 1H), 8.32

(s, 1H), 8.35 (d, 1H), 9.28 (s, 1H).

In analogy to the examples and according to the above-described preparation processes, the following compounds of the formula (I) can be obtained:

Example	Structure
I-1	
I-2	
I-3	
I-4	
I-5	

I-6	
I-7	
I-8	
I-9	
I-10	
I-11	

I-12	
I-13	
I-14	
I-15	

The logP values are measured according to EEC Directive 79/831 Annex V.A8 by HPLC (high-performance liquid chromatography) on a reversed-phase column (C 18). Temperature: 55°C.

The LC-MS determination in the acidic range is effected at pH 2.7 with 0.1% aqueous formic acid and acetonitrile (containing 0.1% formic acid) as mobile phases; linear gradient from 10% acetonitrile to 95% acetonitrile. Called logP (HCOOH) in the table.

The LC-MS determination in the neutral range is effected at pH 7.8 with 0.001 molar aqueous ammonium bicarbonate solution and acetonitrile as mobile phases; linear gradient from 10% acetonitrile to 95% acetonitrile. Called logP (neutral) in the table.

Calibration is carried out using unbranched alkan-2-ones (having 3 to 16 carbon atoms) with known logP values (logP values determined on the basis of the retention times by linear interpolation between two successive alkanones).

The NMR data of selected examples are listed either in conventional form (δ values, multiplet splitting, number of hydrogen atoms) or as NMR peak lists.

In each case, the solvent in which the NMR spectrum was recorded is stated.

NMR peak list method

The ^{1}H NMR data of selected examples are stated in the form of ^{1}H NMR peak lists. For each signal peak, first the δ value in ppm and then the signal intensity in round brackets are listed. The pairs of δ value–signal intensity numbers for different signal peaks are listed with separation from one another by semicolons.

The peak list for one example therefore takes the form of:

δ_1 (intensity$_1$); δ_2 (intensity$_2$);.....; δ_i (intensity$_i$);.....; δ_n (intensity$_n$)

The intensity of sharp signals correlates with the height of the signals in a printed example of an NMR spectrum in cm and shows the true ratios of the signal intensities. In the case of broad signals, several peaks or the middle of the signal and the relative intensity thereof may be shown in comparison to the most intense signal in the spectrum.

For calibration of the chemical shift of ^{1}H NMR spectra, we use tetramethylsilane and/or the chemical shift of the solvent, particularly in the case of spectra which are measured in DMSO. Therefore, the tetramethylsilane peak may but need not occur in NMR peak lists.

The lists of the ^{1}H NMR peaks are similar to the conventional ^{1}H NMR printouts and thus usually contain all peaks listed in a conventional NMR interpretation.

In addition, like conventional ^{1}H NMR printouts, they may show solvent signals, signals of stereoisomers of the target compounds which are likewise provided by the invention, and/or peaks of impurities.

In the reporting of compound signals within the delta range of solvents and/or water, our lists of ^{1}H NMR peaks show the standard solvent peaks, for example peaks of DMSO in DMSO-D_6 and the peak of water, which usually have a high intensity on average.

The peaks of stereoisomers of the target compounds and/or peaks of impurities usually have a lower intensity on average than the peaks of the target compounds (for example with a purity of > 90%).

Such stereoisomers and/or impurities may be typical of the particular preparation process. Their peaks can thus help in identifying reproduction of our preparation process with reference to "by-product fingerprints".

An expert calculating the peaks of the target compounds by known methods (MestreC, ACD simulation, but also with empirically evaluated expected values) can, if required, isolate the peaks of the target compounds, optionally using additional intensity filters. This isolation would be similar to the peak picking in question in conventional ^{1}H NMR interpretation.

Further details of ^{1}H NMR peak lists can be found in the Research Disclosure Database Number 564025.

Example I-1: ^{1}H-NMR(400.0 MHz, d_6-DMSO): δ= 9.951 (2.74); 9.309 (0.35); 9.278 (4.06); 8.382 (0.32); 8.346 (2.73); 8.324 (3.63); 8.313 (0.77); 8.286 (4.41); 8.171 (3.14); 8.148 (2.52); 7.007 (0.68); 6.993 (1.24); 6.98 (0.63); 4.038 (0.58); 4.02 (0.59); 3.952 (1.14); 3.869 (16); 3.825 (0.81); 3.643 (0.96); 3.625 (3.24); 3.607 (3.26); 3.588 (0.97); 3.318 (197.34); 3.201 (0.5); 3.183 (1.68); 3.169 (1.95); 3.151 (1.74); 3.134 (0.52); 2.675 (0.69); 2.67 (0.93); 2.524 (2.11); 2.51 (54.48); 2.506 (115.09); 2.501 (160.6); 2.497 (118.72); 2.493 (56.23); 2.333 (0.66); 2.328 (0.97); 2.324 (0.7); 1.988 (2.5); 1.615 (0.32); 1.398 (0.34); 1.193 (0.85); 1.183 (3.55); 1.175 (1.8); 1.164 (7.99); 1.158 (1.24); 1.146 (3.41); 1.132 (0.46); 1.072 (4.2); 1.054 (8.99); 1.036 (4.02); 0.146 (0.47); 0.008 (3.36); 0 (115.39); -0.008 (3.89); -0.15 (0.47)
Example I-2: ^{1}H-NMR(400.0 MHz, d_6-DMSO): δ= 10.218 (3.32); 9.276 (4.52); 8.378 (2.79); 8.355 (3.37); 8.29 (4.94); 8.127 (2.77); 8.105 (2.42); 7.412 (0.71); 7.398 (1.36); 7.384 (0.73); 5.757 (9.29); 3.875 (16); 3.659 (1.04); 3.64 (3.38); 3.622 (3.43); 3.604 (1.06); 3.445 (1.01); 3.429 (2.79); 3.414 (2.87); 3.398 (1.1); 3.319 (14.36); 2.73 (2.45); 2.714 (4.95); 2.698 (2.26); 2.671 (0.5); 2.506 (63.07); 2.501 (83.1); 2.497 (63.36); 2.328 (0.47); 2.324 (0.39); 1.989 (1.16); 1.185 (3.82); 1.166 (8.25); 1.157 (1.08); 1.148 (3.7); 0 (29.82)
Example I-3: ^{1}H-NMR(400.0 MHz, d_6-DMSO): δ= 10.17 (3); 9.276 (4.28); 8.365 (2.84); 8.342 (3.44); 8.315 (1.9); 8.286 (4.62); 8.106 (2.44); 8.083 (2.17); 7.452 (0.59); 7.438 (1.05); 7.425 (0.66); 7.393 (0.35); 7.382 (0.39); 3.952 (0.35); 3.902 (16); 3.87 (15.47); 3.824 (0.5); 3.652 (0.98); 3.633 (3.32); 3.615 (3.5); 3.596 (1.49); 3.575 (1.11); 3.56 (1.31); 3.547 (1.05); 3.529 (0.86); 3.514 (0.59); 3.32 (64.34); 3.296 (0.85); 3.011 (0.47); 2.992 (0.68); 2.978 (1.07); 2.972 (0.76); 2.96 (0.95); 2.944 (0.59); 2.843 (0.66); 2.829 (1.45); 2.814 (0.79); 2.796 (1.02); 2.782 (0.44); 2.675 (0.66); 2.67 (0.92); 2.666 (0.66); 2.52 (21.93); 2.51 (59.23); 2.506 (120); 2.502 (157.66); 2.497 (112.46); 2.332 (0.64); 2.328 (0.9); 2.324 (0.65); 1.648 (0.39); 1.183 (3.6); 1.165 (8.04); 1.146 (3.55); 1.132 (0.33); 0.008 (1.76); 0 (53.42); -0.008 (2.06)
Example I-4: ^{1}H-NMR(400.0 MHz, d_6-DMSO): δ= 10.062 (2.36); 9.274 (4.04); 8.346 (2.83); 8.323 (3.47); 8.313 (0.45); 8.283 (4.2); 8.128 (2.62); 8.105 (2.19); 6.948 (0.95); 6.937 (0.91); 4.056 (0.33); 4.038 (0.99); 4.02 (0.95); 4.003 (0.37); 3.865 (16); 3.64 (0.96); 3.622 (3.15); 3.603 (3.23); 3.585 (0.93); 3.317 (138.48); 2.708 (6.54); 2.697 (6.53); 2.675 (0.62); 2.671 (0.8); 2.666 (0.59); 2.524 (1.77); 2.51 (44.79); 2.506 (95.76); 2.501 (134.8); 2.497 (100.65); 2.492 (48.08); 2.332 (0.57); 2.328 (0.78); 2.323 (0.58); 1.988 (4.21); 1.193 (1.24); 1.182 (3.39); 1.175 (2.63); 1.164 (7.83); 1.158 (1.75); 1.145 (3.4); 0.146 (0.32); 0.008 (2.43); 0 (80.13); -0.008 (2.59); -0.15 (0.37)
Example I-5: ^{1}H-NMR(400.0 MHz, d_6-DMSO): δ= 10.07 (2.43); 9.297 (3.64); 8.353 (2.49); 8.331 (2.95); 8.294 (3.9); 8.042 (1.81); 8.02 (1.63); 7.452 (0.78); 3.877 (13.95); 3.66 (0.8); 3.641 (2.81); 3.623 (2.87); 3.604 (0.85); 3.376 (0.89); 3.363 (2.69); 3.352 (2.63); 3.328 (1.53); 3.32 (11.45); 3.303 (1.67); 3.291 (0.51); 3.109 (16); 2.524 (0.58); 2.511 (15.95); 2.506 (33.96); 2.502 (46.08); 2.498 (33.79); 2.493 (16.75); 1.989 (1.13); 1.187 (3.1); 1.174 (1.15); 1.168 (7); 1.157 (0.72); 1.15 (3.04); 0.008 (0.59); 0 (19.2); -0.008 (0.75)
Example I-6: ^{1}H-NMR(400.0 MHz, d_6-DMSO): δ= 10.161 (2.7); 9.283 (3.85); 8.352 (2.34); 8.329 (2.78); 8.315 (0.49); 8.286 (4.04); 8.029 (1.89); 8.006 (1.68); 7.535 (0.9); 4.056 (0.35); 4.038 (1.02); 4.02 (1.05); 4.002 (0.35); 3.953 (0.32); 3.869 (13.27); 3.824 (0.37); 3.644 (0.9); 3.626 (2.86); 3.607 (2.9); 3.589 (0.91); 3.374 (0.89); 3.358 (2.43); 3.343 (2.6); 3.319 (28.29); 2.67 (0.81); 2.573 (2.01); 2.557 (4.12); 2.54 (2.03); 2.506 (114.87); 2.502 (142.97); 2.497 (108.98); 2.328 (0.81); 2.048 (0.34); 1.989 (4.25); 1.944 (16); 1.192 (1.4); 1.183 (3.3); 1.175 (3.03); 1.165 (7.04); 1.157 (2.19); 1.147 (3.17); 0.146 (0.42); 0 (88.1); -0.15 (0.44)
Example I-7: ^{1}H-NMR(400.0 MHz, d_6-DMSO): δ= 9.781 (2.98); 9.281 (4.09); 8.349 (2.63); 8.326 (3.66); 8.313 (0.4); 8.286 (4.33); 8.21 (3.47); 8.187 (2.68); 6.878 (1.27); 6.859 (1.24); 4.038 (0.64); 4.02 (0.64); 3.87 (16); 3.831 (0.62); 3.814 (0.97); 3.797 (0.98); 3.78 (0.64); 3.643 (0.94); 3.625 (3.22); 3.606 (3.27); 3.588 (0.97); 3.319 (110.87); 3.295 (0.55); 2.675 (0.75); 2.67 (1.04); 2.666 (0.77); 2.524 (2.7); 2.519 (4.09); 2.51 (58.43); 2.506 (123.3); 2.501 (172.76); 2.497 (129.74); 2.492 (62.59); 2.333 (0.7); 2.328 (1); 2.323 (0.73); 1.988 (2.71); 1.615 (0.62); 1.398 (2.01); 1.193 (0.84); 1.182 (3.48); 1.175 (1.89); 1.164 (7.91); 1.157 (1.37); 1.145 (3.38); 1.107 (15.26); 1.091 (15.17); 1.009 (0.37); 0.993 (0.37); 0.146 (0.98); 0.008 (7.5); 0 (227.94); -0.008 (8.27); -0.15 (1.01)
Example I-8: ^{1}H-NMR(400.0 MHz, d_6-DMSO): δ= 10.27 (3.14); 9.272 (4.26); 8.369 (2.58); 8.346 (3.09); 8.283 (4.54); 8.094 (2.3); 8.071 (2.05); 7.438 (1.08); 7.425 (0.69); 7.389 (0.34); 7.379 (0.41); 3.953 (0.32); 3.902 (16); 3.864 (14.37); 3.824 (0.43); 3.653 (0.97); 3.635 (3.3); 3.616 (4.43); 3.597 (3.38); 3.581 (1.05); 3.334 (2.52); 3.321 (43.53); 3.303 (1.86); 2.972 (14.59); 2.671 (0.73); 2.506 (102.43); 2.502 (128.07); 2.498 (93.41); 2.328 (0.72); 1.65 (0.39); 1.235 (0.42); 1.183 (3.47); 1.165 (7.52); 1.146 (3.41); 0.008 (1.64); 0 (41.09)
Example I-9: 1H-NMR(400.0 MHz, d6-DMSO): δ= 9.2744(2.2);8.2775(2.3);8.2256(1.7);8.2028(1.8);7.2238(1.7);7.2010(1.7);4.0379(0.4);4.0201(0.4);3.9072(8.2);3.7020(0.5);3.6833(1.7);3.6649(1.7);3.6463(0.5);3.3207(21.6);3.2071(8.2);2.9724(0.4);2.9399(16.0);2.8148(0.6);2.6706(0.4);2.5237(1.0);2.5059(54.5);2.5015(72.8);2.4971(52.7);2.3282(0.4);1.9887(1.6);1.2655(1.0);1.2008(1.8);1.1924(0.7);1.1824(4.1);1.1748(1.2);1.1639(1.8);1.1572(0.7);-0.0002(9.1)
Example I-10: 1H-NMR(400.0 MHz, d6-DMSO): δ= 9.2718(4.6);9.1363(3.3);8.2820(4.8);8.2402(4.6);8.1402(0.6);3.8803(16.0);3.7082(1.0);3.6898(3.4);3.6713(3.5);3.65

27(1.1);3.4140(2.4);3.3203(16.7);2.6702(0.6);2.5055(76.8);2.5012(102.9);2.4970(77.1);2.3631(12.3);2.3278(0.6);2.3238(0.5);2.0741(0.6);1.8451(4.1);1.2091(3.7);1.1908(8.1);1.1722(3.6);0.1457(0.3);0.0077(2.6);-0.0002(71.0);-0.0083(3.3)
Example I-11: 1H-NMR(400.0 MHz, d6-DMSO): δ= 9.2692(4.5);9.2260(0.5);9.0211(2.8);8.3155(1.2);8.2974(1.1);8.2817(4.9);8.2377(0.6);8.1728(4.1);7.8092(0.5);6.5312(0.3);3.9596(0.4);3.8824(16.0);3.8096(1.7);3.7116(1.0);3.6927(3.3);3.6743(3.4);3.6559(1.0);3.4745(0.4);3.4551(0.4);3.3199(226.1);2.7078(7.4);2.6962(7.5);2.6746(2.6);2.6703(3.5);2.6658(2.6);2.6229(0.4);2.5235(8.2);2.5057(456.6);2.5013(613.2);2.4969(446.8);2.4354(11.6);2.3517(0.4);2.3327(2.5);2.3279(3.4);2.3241(2.6);2.2138(1.3);2.0746(0.4);2.0103(0.5);1.9893(0.5);1.4550(0.3);1.2912(0.4);1.2361(2.7);1.2120(0.7);1.2003(3.8);1.1819(8.1);1.1633(3.7);1.1499(0.7);1.1315(1.0);1.1138(0.5);0.8549(0.7);0.1462(1.4);0.0077(9.5);-0.0002(279.2);-0.0081(12.1);-0.1498(1.4)
Example I-12: 1H-NMR(400.0 MHz, d6-DMSO): δ= 9.2794(4.2);8.3128(3.2);8.2894(5.7);8.0338(3.4);8.0109(3.0);7.8984(1.2);7.8873(1.2);4.0383(0.6);4.0205(0.6);3.9036(16.0);3.7199(1.0);3.7015(3.3);3.6830(3.4);3.6647(1.0);3.4078(0.3);3.3843(16.1);3.3207(40.9);2.7399(7.7);2.7289(7.7);2.6757(0.4);2.6712(0.5);2.6668(0.4);2.5065(65.1);2.5020(84.2);2.4976(62.2);2.3329(0.4);2.3287(0.5);2.3244(0.4);1.9888(2.4);1.2069(3.6);1.1885(8.2);1.1750(2.0);1.1700(3.6);1.1574(0.7);0.0078(2.5);-0.0002(58.4);-0.0079(2.9)
Example I-13: 1H-NMR(400.0 MHz, d6-DMSO): δ= 9.3515(4.3);9.0153(7.4);9.0064(0.4);8.7868(3.3);8.7649(4.0);8.5030(3.9);8.4810(3.5);8.3362(4.6);8.0675(1.8);7.6937(1.6);7.3327(0.5);7.3245(0.4);5.7560(1.2);4.1954(0.4);4.0100(16.0);3.8854(1.0);3.8670(3.5);3.8485(3.4);3.8301(1.1);3.5678(0.4);3.3307(38.4);2.6755(0.5);2.6709(0.7);2.6667(0.5);2.5105(46.7);2.5063(90.7);2.5018(118.5);2.4974(87.6);2.3329(0.5);2.3286(0.7);2.3242(0.5);1.5995(0.6);1.2620(3.8);1.2436(8.5);1.2251(3.7);0.0077(1.9);-0.0004(43.0);-0.0084(1.8)
Example I-14: 1H-NMR(400.0 MHz, d6-DMSO): δ= 9.7380(3.4);9.2820(4.3);8.3583(1.7);8.3356(4.4);8.3095(4.9);8.2867(6.6);4.0556(0.9);4.0379(2.9);4.0201(2.9);4.0023(1.0);3.8636(16.0);3.8244(0.6);3.6039(1.0);3.5856(3.4);3.5671(3.4);3.5487(1.1);3.4393(2.4);3.3207(57.7);2.6706(0.5);2.6659(0.4);2.5058(59.5);2.5014(79.9);2.4969(62.3);2.3326(0.4);2.3281(0.5);1.9886(12.2);1.8419(3.6);1.1924(3.4);1.1747(9.4);1.1572(10.7);1.1391(3.6);0.0078(1.4);-0.0002(35.4);-0.0081(1.9)
Example I-15: 1H-NMR(400.0 MHz, d6-DMSO): δ= 9.9032(2.3);9.2827(3.0);8.3498(1.8);8.3272(2.5);8.2893(3.2);8.1958(2.8);8.1731(2.3);3.8670(11.7);3.8241(0.8);3.6077(0.7);3.5893(2.4);3.5708(2.4);3.5523(0.7);3.3194(46.3);2.9725(16.0);2.9558(0.6);2.6750(0.4);2.6704(0.6);2.6659(0.4);2.5235(1.9);2.5100(36.8);2.5058(73.8);2.5013(97.1);2.4969(71.3);2.3324(0.4);2.3281(0.6);2.3236(0.4);1.9886(0.4);1.1766(2.7);1.1582(5.9);1.1398(2.5);1.1315(0.6);0.0080(1.8);-0.0002(49.0);-0.0084(2.1)

Use examples

Ctenocephalides felis – in vitro contact tests with adult cat fleas

For the coating of the test tubes, 9 mg of active compound are first dissolved in 1 ml of acetone p.a. and then diluted to the desired concentration with acetone p.a. 250 µl of the solution are distributed homogeneously on the inner walls and the base of a 25 ml glass tube by turning and rocking on an orbital shaker (rocking rotation at 30 rpm for 2 h). With 900 ppm of active compound solution and internal surface area 44.7 cm², given homogeneous distribution, an area-based dose of 5 µg/cm² is achieved.

After the solvent has evaporated off, the tubes are populated with 5-10 adult cat fleas (*Ctenocephalides felis*), sealed with a perforated plastic lid and incubated in a horizontal position at room temperature and ambient humidity. After 48 h, efficacy is determined. To this end, the tubes are stood upright and the fleas are knocked to the base of the tube. Fleas which remain motionless at the base or move in an uncoordinated manner are considered to be dead or moribund.

A substance shows good efficacy against *Ctenocephalides felis* if at least 80% efficacy was achieved in this test at an application rate of 5 µg/cm². 100% efficacy means that all the fleas were dead or moribund. 0% efficacy means that no fleas were harmed.

In this test, for example, the following compound from the preparation examples shows an efficacy of 100% at an application rate of 5 µg/cm² (= 500 g/ha): I-4

Ctenocephalides felis - oral test

Solvent: dimethyl sulfoxide

To produce a suitable active compound preparation, 10 mg of active compound are mixed with 0.5 ml of dimethyl sulfoxide. Dilution with citrated cattle blood gives the desired concentration.

About 20 unfed adult cat fleas (*Ctenocephalides felis*) are placed into a chamber which is closed at the top and bottom with gauze. A metal cylinder whose bottom end is closed with parafilm is placed onto the chamber. The cylinder contains the blood/active compound preparation, which can be imbibed by the fleas through the parafilm membrane.

After 2 days, the kill in % is determined. 100% means that all of the fleas have been killed; 0% means that none of the fleas have been killed.

In this test, for example, the following compound from the preparation examples shows an efficacy of 100% at an application rate of 100 ppm: I-1, I-2, I-3, I-4, I-7, I-8

In this test, for example, the following compound from the preparation examples shows an efficacy of 80% at an application rate of 100 ppm: I-5

Lucilia cuprina test

Solvent: dimethyl sulfoxide

To produce a suitable active compound preparation, 10 mg of active compound are mixed with 0.5 ml of dimethyl sulfoxide, and the concentrate is diluted with water to the desired concentration.

About 20 L1 larvae of the Australian sheep blowfly (*Lucilia cuprina*) are transferred into a test vessel containing minced horsemeat and the active compound preparation of the desired concentration.

After 2 days, the kill in % is determined. 100% means that all the larvae have been killed; 0% means that no larvae have been killed.

In this test, for example, the following compounds from the preparation examples show an efficacy of 100% at an application rate of 100 ppm: I-4, I-5

Meloidogyne incognita test

Solvent: 125.0 parts by weight of acetone

To produce a suitable active compound preparation, 1 part by weight of active compound is mixed with the stated amount of solvent and the concentrate is diluted to the desired concentration with water.
Vessels are filled with sand, active compound solution, an egg/larvae suspension of the southern root-knot nematode (*Meloidogyne incognita)* and lettuce seeds. The lettuce seeds germinate and the plants develop. The galls develop on the roots.

After 14 days, the nematicidal efficacy in % is determined by the formation of galls. 100% means that no galls were found; 0% means that the number of galls on the treated plants corresponds to the untreated control.

In this test, for example, the following compounds from the preparation examples show an efficacy of 100% at an application rate of 20 ppm: I-1, I-2, I-5, I-15

In this test, for example, the following compounds from the preparation examples show an efficacy of 90% at an application rate of 20 ppm: I-3, I-7

Myzus persicae – spray test

Solvent: 78 parts by weight of acetone

1.5 parts by weight of dimethylformamide

Emulsifier: alkylaryl polyglycol ether

To produce a suitable active compound preparation, 1 part by weight of active compound is dissolved with the specified parts by weight of solvent and made up to the desired concentration with water containing an emulsifier concentration of 1000 ppm. To produce further test concentrations, the formulation is diluted with emulsifier-containing water.

Discs of Chinese cabbage leaves (*Brassica pekinensis*) infested by all stages of the green peach aphid (*Myzus persicae*) are sprayed with an active compound preparation of the desired concentration.

After 5 days, the efficacy in % is determined. 100% means that all the aphids have been killed; 0% means that no aphids have been killed.

In this test, for example, the following compound from the preparation examples shows an efficacy of 100% at an application rate of 500 g/ha: I-5

In this test, for example, the following compounds from the preparation examples show an efficacy of 90% at an application rate of 500 g/ha: I-1, I-2, I-4

In this test, for example, the following compound from the preparation examples shows an efficacy of 100% at an application rate of 100 g/ha: I-3

In this test, for example, the following compounds from the preparation examples show an efficacy of 90% at an application rate of 100 g/ha: I-6, I-8, I-12, I-13, I-14, I-15

Myzus persicae – oral test

Solvent: 100 parts by weight of acetone

To produce a suitable active compound preparation, 1 part by weight of active compound is dissolved with the stated parts by weight of solvent and made up to the desired concentration with water.

50 µl of the active compound preparation are transferred into microtitre plates and made up to a final volume of 200 µl with 150 µl of IPL41 insect medium (33% + 15% sugar). Subsequently, the plates are sealed with parafilm, which a mixed population of green peach aphids (*Myzus persicae*) within a second microtitre plate is able to puncture and imbibe the solution.

After 5 days, the efficacy in % is determined. 100% means that all the aphids have been killed; 0% means that no aphids have been killed.

In this test, for example, the following compounds from the preparation examples show an efficacy of 100% at an application rate of 20 ppm: I-2, I-3, I-5, I-6, I-8

In this test, for example, the following compound from the preparation examples show an efficacy of 100% at an application rate of 4 ppm: I-2, I-3, I-5, I-6, I-14, I-15

In this test, for example, the following compound from the preparation examples show an efficacy of 90% at an application rate of 4 ppm: I-8, I-13

Phaedon cochleariae – spray test

Solvent: 78.0 parts by weight of acetone
1.5 parts by weight of dimethylformamide
Emulsifier: alkylaryl polyglycol ether

To produce a suitable active compound preparation, 1 part by weight of active compound is dissolved with the specified parts by weight of solvent and made up to the desired concentration with water containing an emulsifier concentration of 1000 ppm. To produce further test concentrations, the formulation is diluted with emulsifier-containing water.

Discs of Chinese cabbage leaves (*Brassica pekinensis*) are sprayed with an active compound preparation of the desired concentration and, after drying, populated with larvae of the mustard beetle (*Phaedon cochleariae*).

After 7 days, the efficacy in % is determined. 100% means that all the beetle larvae have been killed; 0% means that no beetle larvae have been killed.

In this test, for example, the following compounds from the preparation examples show an efficacy of 100% at an application rate of 500 g/ha: I-1, I-4

In this test, for example, the following compounds from the preparation examples show an efficacy of 100% at an application rate of 100 g/ha: I-6, I-15

Tetranychus urticae – spray test, OP-resistant

Solvent: 78.0 parts by weight of acetone
1.5 parts by weight of dimethylformamide
Emulsifier: alkylaryl polyglycol ether

To produce a suitable active compound preparation, 1 part by weight of active compound is dissolved with the specified parts by weight of solvent and made up to the desired concentration with water containing an emulsifier concentration of 1000 ppm. To produce further test concentrations, the formulation is diluted with emulsifier-containing water.

Discs of bean leaves *(Phaseolus vulgaris)* infested with all stages of the greenhouse red spider mite *(Tetranychus urticae)* are sprayed with an active compound preparation of the desired concentration.

After 6 days, the efficacy in % is determined. 100% means that all the spider mites have been killed; 0% means that no spider mites have been killed.

In this test, for example, the following compounds from the preparation examples shows an efficacy of 100% at an application rate of 100 g/ha: I-3, I-8

In this test, for example, the following compound from the preparation examples shows an efficacy of 90% at an application rate of 100 g/ha: I-1

In this test, for example, the following compound from the preparation examples shows an efficacy of 70% at an application rate of 100 g/ha: I-6

Comparative Examples

Phaedon cochleariae - spray test (PHAECO)

Solvent: 78.0 parts by weight of acetone
1.5 parts by weight of dimethylformamide
Emulsifier: alkylaryl polyglycol ether

To produce a suitable active compound preparation, 1 part by weight of active compound is dissolved with the specified parts by weight of solvent and made up to the desired concentration with water containing an emulsifier concentration of 1000 ppm. To produce further test concentrations, the formulation is diluted with emulsifier-containing water.

Discs of Chinese cabbage leaves (*Brassica pekinensis*) are sprayed with an active compound preparation of the desired concentration and, after drying, populated with larvae of the mustard beetle (*Phaedon cochleariae*).

After the desired period of time, the efficacy in % is determined. 100% means that all the beetle larvae have been killed; 0% means that no beetle larvae have been killed.

In this test, for example, the following compounds from the preparation examples show superior efficacy to the prior art: see table.

Myzus persicae - spray test (MYZUPE)

Solvent: 78.0 parts by weight of acetone
1.5 parts by weight of dimethylformamide
Emulsifier: alkylaryl polyglycol ether

To produce a suitable active compound preparation, 1 part by weight of active compound is dissolved with the specified parts by weight of solvent and made up to the desired concentration with water containing an emulsifier concentration of 1000 ppm. To produce further test concentrations, the formulation is diluted with emulsifier-containing water.

Discs of Chinese cabbage leaves (*Brassica pekinensis*) infested by all stages of the green peach aphid (*Myzus persicae*) are sprayed with an active compound preparation of the desired concentration.

After the desired period of time, the efficacy in % is determined. 100% means that all the aphids have been killed; 0% means that no aphids have been killed.

In this test, for example, the following compounds from the preparation examples show superior efficacy to the prior art: see table.

Tetranychus urticae - spray test; OP-resistant (TETRUR)

Solvent:	78.0	parts by weight of acetone
	1.5	parts by weight of dimethylformamide
Emulsifier:	alkylaryl polyglycol ether	

To produce a suitable active compound preparation, 1 part by weight of active compound is dissolved with the specified parts by weight of solvent and made up to the desired concentration with water containing an emulsifier concentration of 1000 ppm. To produce further test concentrations, the formulation is diluted with emulsifier-containing water.

Discs of bean leaves *(Phaseolus vulgaris)* infested with all stages of the greenhouse red spider mite *(Tetranychus urticae)* are sprayed with an active compound preparation of the desired concentration.

After the desired period of time, the efficacy in % is determined. 100% means that all the spider mites have been killed; 0% means that no spider mites have been killed.

In this test, for example, the following compounds from the preparation examples show superior efficacy to the prior art: see table.

Nezara viridula – spray test (NEZAVI)

Solvent:	52.5	parts by weight of acetone
	7	parts by weight of dimethylformamide
Emulsifier:		alkylaryl polyglycol ether

To produce a suitable active compound preparation, 1 part by weight of active compound is dissolved with the specified parts by weight of solvent and made up to the desired concentration with water containing an emulsifier concentration of 1000 ppm. To produce further test concentrations, the formulation is diluted with emulsifier-containing water. If the addition of ammonium salts or/and penetrants is required, these are each added in a concentration of 1000 ppm to the formulation solution.

Barley plants (*Hordeum vulgare*) infected with larvae of the Southern green shield bug (*Nezara viridula*) are srayed with an active compound preparation of the desired concentration.

After the desired period of time, the efficacy in % is determined. 100% means that all of the shield bugs have been killed; 0% means that none of the shield bugs have been killed.

In this test, for example, the following compounds from the preparation examples show superior efficacy to the prior art: see table.

Nilaparvata lugens - spray test (NILALU)

Solvent:	52.5	parts by weight of acetone
	7	parts by weight of dimethylformamide
Emulsifier:		alkylaryl polyglycol ether

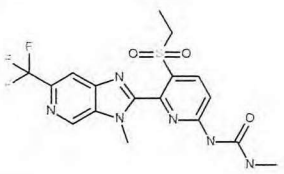
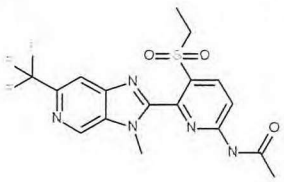
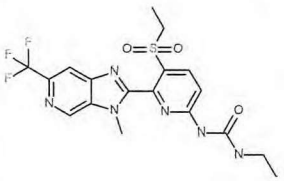
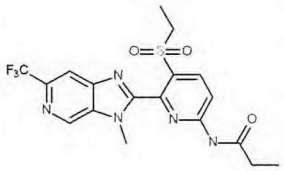
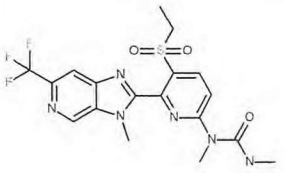
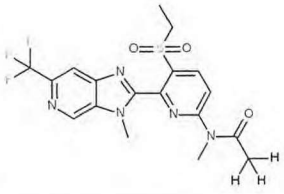
To produce a suitable active compound preparation, 1 part by weight of active compound is dissolved with the specified parts by weight of solvent and made up to the desired concentration with water containing an emulsifier concentration of 1000 ppm. To produce further test concentrations, the formulation is diluted with emulsifier-containing water. If the addition of ammonium salts or/and penetrants is required, these are each added in a concentration of 1000 ppm to the formulation solution.

Rice plants *(Oryza sativa)* are sprayed with an active compound preparation of the desired concentration and then populated with larvae of the brown planthopper (*Nilaparvata lugens*).

After the desired period of time, the efficacy in % is determined. 100% means that all of the planthoppers have been killed; 0% means that none of the planthoppers have been killed.

In this test, for example, the following compounds from the preparation examples show superior efficacy to the prior art: see table.

Table:

Substance	Structure	Object	concentration	% efficacy dat
Example No. I-4 according to the invention		NEZAVI	20 g/ha	100 4 dat
Example No. I-49 known from WO 2015/121136		NEZAVI	20 g/ha	0 4 dat
Example No. I-1 according to the invention		PHAECO TETRUR	20 g/ha 500 g/ha 100 g/ha	83 7 dat 90 6 dat 90 6 dat
Example No. 13 known from WO 2016/124557		PHAECO TETRUR	20 g/ha 500 g/ha 100 g/ha	50 7 dat 70 6 dat 0 6 dat
Example No. I-12 according to the invention		NILALU MYZUPE	4 g/ha 20 g/ha	90 4 dat 90 5 dat
Example No. 69 known from WO 2016/124557		NILALU MYZUPE	4 g/ha 20 g/ha	0 4 dat 0 5 dat

dat = days after treatment

2017340690 07 Apr 2021

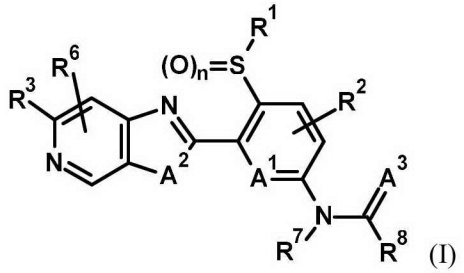
Throughout this specification and the claims which follow, unless the context requires otherwise, the word "comprise", and variations such as "comprises" or "comprising", will be understood to imply the inclusion of a stated integer or step or group of integers or steps but not the exclusion of any other integer or step or group of integers or steps.

The reference in this specification to any prior publication (or information derived from it), or to any matter which is known, is not, and should not be taken as an acknowledgment or admission or any form of suggestion that that prior publication (or information derived from it) or known matter forms part of the common general knowledge in the field of endeavour to which this specification relates.

2017340690 07 Apr 2021

The claims defining the invention are as follows:

1. A compound of the formula (I)



(I)

in which

A^1 represents nitrogen, $=N^+(O^-)$- or $=C(R^4)$-,

A^2 represents $-N(R^5)$-, oxygen or sulfur,

A^3 represents oxygen or sulfur,

R^1 represents (C_1-C_6)-alkyl, (C_1-C_6)-haloalkyl, (C_1-C_6)-cyanoalkyl, (C_1-C_6)-hydroxyalkyl, (C_1-C_6)-alkoxy-(C_1-C_6)-alkyl, (C_1-C_6)-haloalkoxy-(C_1-C_6)-alkyl, (C_2-C_6)-alkenyl, (C_2-C_6)-alkenyloxy-(C_1-C_6)-alkyl, (C_2-C_6)-haloalkenyloxy-(C_1-C_6)-alkyl, (C_2-C_6)-haloalkenyl, (C_2-C_6)-cyanoalkenyl, (C_2-C_6)-alkynyl, (C_2-C_6)-alkynyloxy-(C_1-C_6)-alkyl, (C_2-C_6)-haloalkynyloxy-(C_1-C_6)-alkyl, (C_2-C_6)-haloalkynyl, (C_2-C_6)-cyanoalkynyl, (C_3-C_8)-cycloalkyl, (C_3-C_8)-cycloalkyl-(C_3-C_8)-cycloalkyl, (C_1-C_6)-alkyl-(C_3-C_8)-cycloalkyl, halo-(C_3-C_8)-cycloalkyl, amino, (C_1-C_6)-alkylamino, di-(C_1-C_6)-alkylamino, (C_3-C_8)-cycloalkylamino, (C_1-C_6)-alkylcarbonylamino, (C_1-C_6)-alkylthio-(C_1-C_6)-alkyl, (C_1-C_6)-haloalkylthio-(C_1-C_6)-alkyl, (C_1-C_6)-alkylsulfinyl-(C_1-C_6)-alkyl, (C_1-C_6)-haloalkylsulfinyl-(C_1-C_6)-alkyl, (C_1-C_6)-alkylsulfonyl-(C_1-C_6)-alkyl, (C_1-C_6)-haloalkylsulfonyl-(C_1-C_6)-alkyl, (C_1-C_6)-alkoxy-(C_1-C_6)-alkylthio-(C_1-C_6)-alkyl, (C_1-C_6)-alkoxy-(C_1-C_6)-alkylsulfinyl-(C_1-C_6)-alkyl, (C_1-C_6)-alkoxy-(C_1-C_6)-alkylsulfonyl-(C_1-C_6)-alkyl, (C_1-C_6)-alkylcarbonyl-(C_1-C_6)-alkyl, (C_1-C_6)-haloalkylcarbonyl-(C_1-C_6)alkyl, (C_1-C_6)-alkoxycarbonyl-(C_1-C_6)-alkyl, (C_1-C_6)-haloalkoxycarbonyl-(C_1-C_6)-alkyl, (C_1-C_6)-alkylsulfonylamino, aminosulfonyl-(C_1-C_6)-alkyl, (C_1-C_6)-alkylaminosulfonyl-(C_1-C_6)-alkyl, di-(C_1-C_6)-alkylaminosulfonyl-(C_1-C_6)-alkyl,

or represents (C_1-C_6)-alkyl, (C_1-C_6)-alkoxy, (C_2-C_6)-alkenyl, (C_2-C_6)-alkynyl, (C_3-C_8)-cycloalkyl, each of which is optionally mono- or polysubstituted by identical or different substituents from the group consisting of aryl, hetaryl and heterocyclyl, where aryl, hetaryl or heterocyclyl may each optionally be mono- or polysubstituted by identical or different substituents from the group consisting of halogen, cyano, nitro, hydroxy, amino, carboxy, carbamoyl, aminosulfonyl, (C_1-C_6)-alkyl, (C_3-C_6)-cycloalkyl, (C_1-C_6)-alkoxy, (C_1-C_6)-haloalkyl, (C_1-C_6)-haloalkoxy, (C_1-C_6)-alkylthio,

(C_1-C_6)-alkylsulfinyl, (C_1-C_6)-alkylsulfonyl, (C_1-C_6)-alkylsulfimino, (C_1-C_6)-alkylsulfimino-(C_1-C_6)-alkyl, (C_1-C_6)-alkylsulfimino-(C_2-C_6)-alkylcarbonyl, (C_1-C_6)-alkylsulfoximino, (C_1-C_6)-alkylsulfoximino-(C_1-C_6)-alkyl, (C_1-C_6)-alkylsulfoximino-(C_2-C_6)-alkylcarbonyl, (C_1-C_6)-alkoxycarbonyl, (C_1-C_6)-alkylcarbonyl, (C_3-C_6)-trialkylsilyl and benzyl, or

R^1 represents aryl, hetaryl or heterocyclyl, each of which is optionally mono- or polysubstituted by identical or different substituents from the group consisting of halogen, cyano, nitro, hydroxy, amino, carboxyl, carbamoyl, (C_1-C_6)-alkyl, (C_3-C_8)-cycloalkyl, (C_1-C_6)-alkoxy, (C_1-C_6)-haloalkyl, (C_1-C_6)-haloalkoxy, (C_1-C_6)-alkylthio, (C_1-C_6)-alkylsulfinyl, (C_1-C_6)-alkylsulfonyl, (C_1-C_6)-alkylsulfimino, (C_1-C_6)-alkylsulfimino-(C_1-C_6)-alkyl, (C_1-C_6)-alkylsulfimino-(C_2-C_6)-alkylcarbonyl, (C_1-C_6)-alkylsulfoximino, (C_1-C_6)-alkylsulfoximino-(C_1-C_6)-alkyl, (C_1-C_6)-alkylsulfoximino-(C_2-C_6)-alkylcarbonyl, (C_1-C_6)-alkoxycarbonyl, (C_1-C_6)-alkylcarbonyl, (C_3-C_6)-trialkylsilyl, (=O) (only in the case of heterocyclyl) and $(=O)_2$ (only in the case of heterocyclyl),

R^2, R^3, R^4 and R^6 independently of one another represent hydrogen, cyano, halogen, nitro, acetyl, hydroxy, amino, SCN, tri-(C_1-C_6)-alkylsilyl, (C_3-C_8)-cycloalkyl, (C_3-C_8)-cycloalkyl-(C_3-C_8)-cycloalkyl, (C_1-C_6)-alkyl-(C_3-C_8)-cycloalkyl, halo-(C_3-C_8)-cycloalkyl, (C_1-C_6)-alkyl, (C_1-C_6)-haloalkyl, (C_1-C_6)-cyanoalkyl, (C_1-C_6)-hydroxyalkyl, hydroxycarbonyl-(C_1-C_6)-alkoxy, (C_1-C_6)-alkoxycarbonyl-(C_1-C_6)-alkyl, (C_1-C_6)-alkoxy-(C_1-C_6)-alkyl, (C_2-C_6)-alkenyl, (C_2-C_6)-haloalkenyl, (C_2-C_6)-cyanoalkenyl, (C_2-C_6)-alkynyl, (C_2-C_6)-haloalkynyl, (C_2-C_6)-cyanoalkynyl, (C_1-C_6)-alkoxy, (C_1-C_6)-haloalkoxy, (C_1-C_6)-cyanoalkoxy, (C_1-C_6)-alkoxycarbonyl-(C_1-C_6)-alkoxy, (C_1-C_6)-alkoxy-(C_1-C_6)-alkoxy, (C_1-C_6)-alkylhydroxyimino, (C_1-C_6)-alkoxyimino, (C_1-C_6)-alkyl-(C_1-C_6)-alkoxyimino, (C_1-C_6)-haloalkyl-(C_1-C_6)-alkoxyimino, (C_1-C_6)-alkylthio, (C_1-C_6)-haloalkylthio, (C_1-C_6)-alkoxy-(C_1-C_6)-alkylthio, (C_1-C_6)-alkylthio-(C_1-C_6)-alkyl, (C_1-C_6)-alkylsulfinyl, (C_1-C_6)-haloalkylsulfinyl, (C_1-C_6)-alkoxy-(C_1-C_6)-alkylsulfinyl, (C_1-C_6)-alkylsulfinyl-(C_1-C_6)-alkyl, (C_1-C_6)-alkylsulfonyl, (C_1-C_6)-haloalkylsulfonyl, (C_1-C_6)-alkoxy-(C_1-C_6)-alkylsulfonyl, (C_1-C_6)-alkylsulfonyl-(C_1-C_6)-alkyl, (C_1-C_6)-alkylsulfonyloxy, (C_1-C_6)-alkylcarbonyl, (C_1-C_6)-alkylthiocarbonyl, (C_1-C_6)-haloalkylcarbonyl, (C_1-C_6)-alkylcarbonyloxy, (C_1-C_6)-alkoxycarbonyl, (C_1-C_6)-haloalkoxycarbonyl, aminocarbonyl, (C_1-C_6)-alkylaminocarbonyl, (C_1-C_6)-alkylaminothiocarbonyl, di-(C_1-C_6)-alkylaminocarbonyl, di-(C_1-C_6)-alkylaminothiocarbonyl, (C_2-C_6)-alkenylaminocarbonyl, di-(C_2-C_6)-alkenylaminocarbonyl, (C_3-C_8)-cycloalkylaminocarbonyl, (C_1-C_6)-alkylsulfonylamino, (C_1-C_6)-alkylamino, di-(C_1-C_6)-alkylamino, aminosulfonyl, (C_1-C_6)-alkylaminosulfonyl, di-(C_1-C_6)-alkylaminosulfonyl, (C_1-C_6)-alkylsulfoximino, aminothiocarbonyl, (C_1-C_6)-alkylaminothiocarbonyl, di-(C_1-C_6)-alkyl-aminothiocarbonyl, (C_3-C_8)-cycloalkylamino, NHCO-(C_1-C_6)-alkyl ((C_1-C_6)-alkylcarbonylamino), SF_5 or

represent aryl or hetaryl, each of which is optionally mono- or polysubstituted by identical or

different substituents, where (in the case of hetaryl) at least one carbonyl group may optionally be present and/or where possible substituents are in each case as follows: cyano, carboxyl, halogen, nitro, acetyl, hydroxy, amino, SCN, tri-(C_1-C_6)-alkylsilyl, (C_1-C_6)-alkyl, (C_1-C_6)-haloalkyl, (C_1-C_6)-cyanoalkyl, (C_1-C_6)-hydroxyalkyl, hydroxycarbonyl-(C_1-C_6)-alkoxy, (C_1-C_6)-alkoxycarbonyl-(C_1-C_6)-alkyl, (C_1-C_6)-alkoxy-(C_1-C_6)-alkyl, (C_2-C_6)-alkenyl, (C_2-C_6)-haloalkenyl, (C_2-C_6)-cyanoalkenyl, (C_2-C_6)-alkynyl, (C_2-C_6)-haloalkynyl, (C_2-C_6)-cyanoalkynyl, (C_1-C_6)-alkoxy, (C_1-C_6)-haloalkoxy, (C_1-C_6)-cyanoalkoxy, (C_1-C_6)-alkoxycarbonyl-(C_1-C_6)-alkoxy, (C_1-C_6)-alkoxy-(C_1-C_6)-alkoxy, (C_1-C_6)-alkylhydroxyimino, (C_1-C_6)-alkoxyimino, (C_1-C_6)-alkyl-(C_1-C_6)-alkoxyimino, (C_1-C_6)-haloalkyl-(C_1-C_6)-alkoxyimino, (C_1-C_6)-alkylthio, (C_1-C_6)-haloalkylthio, (C_1-C_6)-alkoxy-(C_1-C_6)-alkylthio, (C_1-C_6)-alkylthio-(C_1-C_6)-alkyl, (C_1-C_6)-alkylsulfinyl, (C_1-C_6)-haloalkylsulfinyl, (C_1-C_6)-alkoxy-(C_1-C_6)-alkylsulfinyl, (C_1-C_6)-alkylsulfinyl-(C_1-C_6)-alkyl, (C_1-C_6)-alkylsulfonyl, (C_1-C_6)-haloalkylsulfonyl, (C_1-C_6)-alkoxy-(C_1-C_6)-alkylsulfonyl, (C_1-C_6)-alkylsulfonyl-(C_1-C_6)-alkyl, (C_1-C_6)-alkylsulfonyloxy, (C_1-C_6)-alkylcarbonyl, (C_1-C_6)-haloalkylcarbonyl, (C_1-C_6)-alkylcarbonyloxy, (C_1-C_6)-alkoxycarbonyl, (C_1-C_6)-haloalkoxycarbonyl, aminocarbonyl, (C_1-C_6)-alkylaminocarbonyl, di-(C_1-C_6)-alkyl-aminocarbonyl, (C_2-C_6)-alkenylaminocarbonyl, di-(C_2-C_6)-alkenylaminocarbonyl, (C_3-C_8)-cycloalkylaminocarbonyl, (C_1-C_6)-alkylsulfonylamino, (C_1-C_6)-alkylamino, di-(C_1-C_6)-alkylamino, aminosulfonyl, (C_1-C_6)-alkylaminosulfonyl, di-(C_1-C_6)-alkylaminosulfonyl, (C_1-C_6)-alkylsulfoximino, aminothiocarbonyl, (C_1-C_6)-alkylaminothiocarbonyl, di-(C_1-C_6)-alkylaminothiocarbonyl, (C_3-C_8)-cycloalkylamino,

R^5 represents (C_1-C_6)-alkyl, (C_1-C_6)-haloalkyl, (C_1-C_6)-cyanoalkyl, (C_1-C_6)-hydroxyalkyl, (C_1-C_6)-alkoxy-(C_1-C_6)-alkyl, (C_1-C_6)-haloalkoxy-(C_1-C_6)-alkyl, (C_2-C_6)-alkenyl, (C_2-C_6)-alkenyloxy-(C_1-C_6)-alkyl, (C_2-C_6)-haloalkenyloxy-(C_1-C_6)-alkyl, (C_2-C_6)-haloalkenyl, (C_2-C_6)-cyanoalkenyl, (C_2-C_6)-alkynyl, (C_2-C_6)-alkynyloxy-(C_1-C_6)-alkyl, (C_2-C_6)-haloalkynyloxy-(C_1-C_6)-alkyl, (C_2-C_6)-haloalkynyl, (C_2-C_6)-cyanoalkynyl, (C_3-C_8)-cycloalkyl, (C_3-C_8)-cycloalkyl-(C_3-C_8)-cycloalkyl, (C_1-C_6)-alkyl-(C_3-C_8)-cycloalkyl, halo-(C_3-C_8)-cycloalkyl, (C_1-C_6)-alkylthio-(C_1-C_6)-alkyl, (C_1-C_6)-haloalkylthio-(C_1-C_6)-alkyl, (C_1-C_6)-alkylsulfinyl-(C_1-C_6)-alkyl, (C_1-C_6)-haloalkylsulfinyl-(C_1-C_6)-alkyl, (C_1-C_6)-alkylsulfonyl-(C_1-C_6)-alkyl, (C_1-C_6)-haloalkylsulfonyl-(C_1-C_6)-alkyl, (C_1-C_6)-alkoxy-(C_1-C_6)-alkylthio-(C_1-C_6)-alkyl, (C_1-C_6)-alkoxy-(C_1-C_6)-alkylsulfinyl-(C_1-C_6)-alkyl, (C_1-C_6)-alkoxy-(C_1-C_6)-alkylsulfonyl-(C_1-C_6)-alkyl, (C_1-C_6)-alkylcarbonyl-(C_1-C_6)-alkyl, (C_1-C_6)-haloalkylcarbonyl-(C_1-C_6)-alkyl, (C_1-C_6)-alkoxycarbonyl-(C_1-C_6)-alkyl, (C_1-C_6)-haloalkoxycarbonyl-(C_1-C_6)-alkyl, aminocarbonyl-(C_1-C_6)-alkyl, (C_1-C_6)-alkylamino-(C_1-C_6)-alkyl, di-(C_1-C_6)-alkylamino-(C_1-C_6)-alkyl or (C_3-C_8)-cycloalkylamino-(C_1-C_6)-alkyl,

R^7 represents hydrogen or represents (C_1-C_6)-alkyl, (C_1-C_6)-alkoxy-(C_1-C_6)-alkyl, (C_2-C_6)-alkenyl, (C_2-C_6)-alkynyl, (C_3-C_6)-cycloalkyl, (C_3-C_{12})-cycloalkyl-(C_1-C_6)-alkyl or (C_4-C_{12})-bicycloalkyl, each of which is optionally mono- or polysubstituted by identical or different

substituents, where the substituents independently of one another may be selected from the group consisting of halogen, cyano, nitro, hydroxy, (C_1-C_6)-alkyl, (C_1-C_4)-haloalkyl, (C_3-C_6)-cycloalkyl, (C_1-C_4)-alkoxy, (C_1-C_4)-haloalkoxy, (C_1-C_4)-alkylthio, (C_1-C_4)-alkylsulfinyl, (C_1-C_4)-alkylsulfonyl, (C_2-C_6)-alkoxycarbonyl, (C_2-C_6)-alkylcarbonyl, amino, (C_1-C_4)-alkylamino, di-(C_1-C_4-alkyl)amino, (C_3-C_6)-cycloalkylamino, a phenyl ring or a 3- or 6-membered aromatic, partially saturated or saturated heterocycle, where the phenyl ring or heterocycle may in each case optionally be mono- or polysubstituted by identical or different substituents, and where the substituents independently of one another may be selected from the group consisting of (C_1-C_6)-alkyl, (C_2-C_6)-alkenyl, (C_2-C_6)-alkynyl, (C_3-C_6)-cycloalkyl, (C_1-C_6)-haloalkyl, (C_2-C_6)-haloalkenyl, (C_2-C_6)-haloalkynyl, (C_3-C_6)-halocycloalkyl, halogen, cyano, NO_2, OH, (C_1-C_4)-alkoxy, (C_1-C_4)-haloalkoxy, (C_1-C_4)-alkylthio, (C_1-C_4)-alkylsulfinyl, (C_1-C_4)-alkylsulfonyl, (C_1-C_4)-haloalkylthio, (C_1-C_4)-haloalkylsulfinyl, (C_1-C_4)-haloalkylsulfonyl, (C_1-C_4)-alkylamino, di-(C_1-C_4-alkyl)amino, (C_3-C_6)-cycloalkylamino, (C_1-C_6-alkyl)carbonyl, (C_1-C_6-alkoxy)carbonyl, aminocarbonyl, (C_1-C_6-alkyl)aminocarbonyl, di-(C_1-C_4-alkyl)aminocarbonyl,

R^8 represents amino or (C_1-C_6)-alkylamino, di-(C_1-C_4)-alkylamino, (C_2-C_6)-alkenylamino, (C_2-C_6)-alkynylamino, (C_3-C_{12})-cycloalkylamino, (C_3-C_{12})-cycloalkyl-(C_1-C_6)-alkylamino, (C_4-C_{12})-bicycloalkylamino or hydrazino, each of which is optionally mono- or polysubstituted by identical or different substituents, where the substituents independently of one another may be selected from the group consisting of halogen, cyano, amino, nitro, hydroxy, (C=O)OH, (C_1-C_6)-alkyl, (C_3-C_6)-cycloalkyl, (C_1-C_4)-alkoxy, (C_1-C_4)-haloalkoxy, (C_1-C_4)-alkylthio, (C_1-C_4)-haloalkylthio, (C_1-C_4)-alkylsulfinyl, (C_1-C_4)-haloalkylsulfinyl, (C_1-C_4)-alkylsulfonyl, (C_1-C_4)-haloalkylsulfonyl, (C_1-C_4)-alkylsulfimino, (C_1-C_4)-alkylsulfoximino, (C_2-C_6)-alkoxycarbonyl, (C_2-C_6)-alkylcarbonyl, (C_1-C_6)-alkylthiocarbonyl, (C_1-C_6)-haloalkylcarbonyl, (C_1-C_6)-haloalkylthiocarbonyl, (C_1-C_6)-alkylcarbonylamino, aminocarbonyl, (C_1-C_6)-alkylaminocarbonyl, di-(C_1-C_6)-alkylaminocarbonyl, aminothiocarbonyl, (C_1-C_6)-alkylaminothiocarbonyl, di-(C_1-C_6)-alkylaminothiocarbonyl, (C_3-C_6)-trialkylsilyl, (C_1-C_4)-alkylamino, di-(C_1-C_4)-alkylamino, (C_3-C_6)-cycloalkylamino, aminosulfonyl, (C_1-C_6)-alkylaminosulfonyl, di-(C_1-C_6)-alkylaminosulfonyl, sulfonylamino, (C_1-C_6)-alkylsulfonylamino, di-(C_1-C_6)-alkylsulfonylamino, a phenyl ring or a 3- to 6-membered aromatic, partially saturated or saturated heterocycle, where the phenyl ring or heterocycle may in each case optionally be mono- or polysubstituted by identical or different substituents, and where the substituents independently of one another may be selected from the group consisting of (C_1-C_6)-alkyl, (C_2-C_6)-alkenyl, (C_2-C_6)-alkynyl, (C_3-C_6)-cycloalkyl, (C_1-C_6)-haloalkyl, (C_2-C_6)-haloalkenyl, (C_2-C_6)-haloalkynyl, (C_3-C_6)-halocycloalkyl, halogen, CN, (C=O)OH, NO_2, OH, (C_1-C_4)-alkoxy, (C_1-C_4)-haloalkoxy, (C_1-C_4)-alkylthio, (C_1-C_4)-alkylsulfinyl, (C_1-C_4)-alkylsulfonyl, (C_1-C_4)-haloalkylthio, (C_1-C_4)-haloalkylsulfinyl, (C_1-C_4)-haloalkylsulfonyl, aminosulfonyl, (C_1-C_6)-alkylaminosulfonyl, di-(C_1-C_6)-alkylaminosulfonyl, (C_1-C_6)-alkylcarbonyl, (C_1-C_6)-

2017340690 07 Apr 2021

alkoxycarbonyl, aminocarbonyl, (C_1-C_6)-alkylaminocarbonyl, di-(C_1-C_4)-alkylaminocarbonyl, tri-(C_1-C_2)-alkylsilyl,

or

R^8 represents a 3- to 6-membered aromatic, partially saturated or saturated heterocycle which is attached via a nitrogen atom and where the heteroatoms are selected from the group consisting of N, S, O, where in each case at least one carbonyl group may be present and/or the heterocycle may in each case optionally be mono- or polysubstituted by identical or different substituents, where the substituents independently of one another may be selected from the group consisting of (C_1-C_6)-alkyl, (C_2-C_6)-alkenyl, (C_2-C_6)-alkynyl, (C_3-C_6)-cycloalkyl, (C_1-C_6)-haloalkyl, (C_2-C_6)-haloalkenyl, (C_2-C_6)-haloalkynyl, (C_3-C_6)-halocycloalkyl, halogen, CN, (C=O)OH, NO_2, OH, (C_1-C_4)-alkoxy, (C_1-C_4)-haloalkoxy, (C_1-C_4)-alkylthio, (C_1-C_4)-alkylsulfinyl, (C_1-C_4)-alkylsulfonyl, (C_1-C_4)-haloalkylthio, (C_1-C_4)-haloalkylsulfinyl, (C_1-C_4)-haloalkylsulfonyl, aminosulfonyl, (C_1-C_6)-alkylaminosulfonyl, di-(C_1-C_6)-alkylaminosulfonyl, amino, (C_1-C_4)-alkylamino, di-(C_1-C_4)-alkylamino, (C_3-C_6)-cycloalkylamino, (C_1-C_6)-alkylcarbonyl, (C_1-C_6)-alkoxycarbonyl, aminocarbonyl, (C_1-C_6)-alkylaminocarbonyl, di-(C_1-C_4)-alkylaminocarbonyl, tri-(C_1-C_2)-alkylsilyl, SF_5, and

n represents 0, 1 or 2.

2. A compound of the formula (I) according to Claim 1, in which

A^1 represents nitrogen, $=N^+(O^-)$- or $=C(R^4)$-,

A^2 represents $-N(R^5)$-, oxygen or sulfur,

A^3 represents oxygen or sulfur,

R^1 represents (C_1-C_4)-alkyl, (C_1-C_4)-hydroxyalkyl, (C_1-C_4)-haloalkyl, (C_1-C_4)-cyanoalkyl, (C_1-C_4)-alkoxy-(C_1-C_4)-alkyl, (C_1-C_4)-haloalkoxy-(C_1-C_4)-alkyl, (C_2-C_4)-alkenyl, (C_2-C_4)-alkenyloxy-(C_1-C_4)-alkyl, (C_2-C_4)-haloalkenyloxy-(C_1-C_4)-alkyl, (C_2-C_4)-haloalkenyl, (C_2-C_4)-cyanoalkenyl, (C_2-C_4)-alkynyl, (C_2-C_4)-alkynyloxy-(C_1-C_4)-alkyl, (C_2-C_4)-haloalkynyloxy-(C_1-C_4)-alkyl, (C_2-C_4)-haloalkynyl, (C_2-C_4)-cyanoalkynyl, (C_3-C_6)-cycloalkyl, (C_3-C_6)-cycloalkyl-(C_3-C_6)-cycloalkyl, (C_1-C_4)-alkyl-(C_3-C_6)-cycloalkyl, halo-(C_3-C_6)-cycloalkyl, (C_1-C_4)-alkylamino, di-(C_1-C_4)-alkylamino, (C_3-C_6)-cycloalkylamino, (C_1-C_4)-alkylcarbonylamino, (C_1-C_4)-alkylthio-(C_1-C_4)-alkyl, (C_1-C_4)-haloalkylthio-(C_1-C_4)-alkyl, (C_1-C_4)-alkylsulfinyl-(C_1-C_4)-alkyl, (C_1-C_4)-haloalkylsulfinyl-(C_1-C_4)-alkyl, (C_1-C_4)-alkylsulfonyl-(C_1-C_4)-alkyl, (C_1-C_4)-alkylcarbonyl-(C_1-C_4)-alkyl, (C_1-C_4)-haloalkylcarbonyl-(C_1-C_4)-alkyl, (C_1-C_4)-alkylsulfonylamino,

or represents (C_1-C_4)-alkyl, (C_1-C_4)-alkoxy, (C_2-C_4)-alkenyl, (C_2-C_4)-alkynyl, (C_3-C_6)-cycloalkyl, each of which is optionally mono- or disubstituted by identical or different substituents from the group consisting of aryl, hetaryl and heterocyclyl, where aryl, hetaryl and heterocyclyl may each optionally be mono- or disubstituted by identical or different substituents from the group consisting of halogen, cyano, carbamoyl, aminosulfonyl, (C_1-C_4)-alkyl, (C_3-C_4)-cycloalkyl, (C_1-C_4)-alkoxy, (C_1-C_4)-haloalkyl, (C_1-C_4)-haloalkoxy, (C_1-C_4)-alkylthio, (C_1-C_4)-alkylsulfinyl, (C_1-C_4)-alkylsulfonyl, (C_1-C_4)-alkylsulfimino, or

R^1 represents aryl, hetaryl or heterocyclyl, each of which is optionally mono- or disubstituted by identical or different substituents from the group consisting of halogen, cyano, carbamoyl, (C_1-C_4)-alkyl, (C_3-C_6)-cycloalkyl, (C_1-C_4)-alkoxy, (C_1-C_4)-haloalkyl, (C_1-C_4)-haloalkoxy, (C_1-C_4)-alkylthio, (C_1-C_4)-alkylsulfinyl, (C_1-C_4)-alkylsulfonyl, (C_1-C_4)-alkylsulfimino, (C_1-C_4)-alkylsulfoximino, (C_1-C_4)-alkylcarbonyl, (C_3-C_4)-trialkylsilyl, (=O) (only in the case of heterocyclyl) or $(=O)_2$ (only in the case of heterocyclyl),

R^2, R^3, R^4 and R^6 independently of one another represent hydrogen, cyano, halogen, nitro, acetyl, hydroxy, amino, SCN, tri-(C_1-C_4)-alkylsilyl, (C_3-C_6)-cycloalkyl, (C_3-C_6)-cycloalkyl-(C_3-C_6)-cycloalkyl, (C_1-C_4)-alkyl-(C_3-C_6)-cycloalkyl, halo-(C_3-C_6)-cycloalkyl, (C_1-C_4)-alkyl, (C_1-C_4)-haloalkyl, (C_1-C_4)-cyanoalkyl, (C_1-C_4)-hydroxyalkyl, (C_1-C_4)-alkoxy-(C_1-C_4)-alkyl, (C_2-C_4)-alkenyl, (C_2-C_4)-haloalkenyl, (C_2-C_4)-cyanoalkenyl, (C_2-C_4)-alkynyl, (C_2-C_4)-haloalkynyl, (C_2-C_4)-cyanoalkynyl, (C_1-C_4)-alkoxy, (C_1-C_4)-haloalkoxy, (C_1-C_4)-cyanoalkoxy, (C_1-C_4)-alkoxy-(C_1-C_4)-alkoxy, (C_1-C_4)-alkylhydroxyimino, (C_1-C_4)-alkoxyimino, (C_1-C_4)-alkyl-(C_1-C_4)-alkoxyimino, (C_1-C_4)-haloalkyl-(C_1-C_4)-alkoxyimino, (C_1-C_4)-alkylthio, (C_1-C_4)-haloalkylthio, (C_1-C_4)-alkylthio-(C_1-C_4)-alkyl, (C_1-C_4)-alkylsulfinyl, (C_1-C_4)-haloalkylsulfinyl, (C_1-C_4)-alkylsulfinyl-(C_1-C_4)-alkyl, (C_1-C_4)-alkylsulfonyl, (C_1-C_4)-haloalkylsulfonyl, (C_1-C_4)-alkylsulfonyl-(C_1-C_4)-alkyl, (C_1-C_4)-alkylsulfonyloxy, (C_1-C_4)-alkylcarbonyl, (C_1-C_4)-haloalkylcarbonyl, aminocarbonyl, (C_1-C_4)-alkylaminocarbonyl, di-(C_1-C_4)-alkylaminocarbonyl, (C_1-C_4)-alkylsulfonylamino, (C_1-C_4)-alkylamino, di-(C_1-C_4)-alkylamino, aminosulfonyl, (C_1-C_4)-alkylaminosulfonyl, di-(C_1-C_4)-alkylaminosulfonyl, aminothiocarbonyl, NHCO-(C_1-C_4)-alkyl ((C_1-C_4)-alkylcarbonylamino), SF_5 or

represent phenyl or hetaryl, each of which is optionally mono- or disubstituted by identical or different substituents, where (in the case of hetaryl) at least one carbonyl group may optionally be present and/or where possible substituents are in each case as follows: cyano, halogen, nitro, acetyl, amino, (C_1-C_4)-alkyl, (C_1-C_4)-haloalkyl, (C_1-C_4)-cyanoalkyl, (C_1-C_4)-hydroxyalkyl, (C_1-C_4)-alkoxy-(C_1-C_4)-alkyl, (C_2-C_4)-alkenyl, (C_2-C_4)-haloalkenyl, (C_2-C_4)-cyanoalkenyl, (C_2-C_4)-alkynyl, (C_2-C_4)-haloalkynyl, (C_2-C_4)-cyanoalkynyl, (C_1-C_4)-alkoxy, (C_1-C_4)-haloalkoxy, (C_1-C_4)-cyanoalkoxy, (C_1-C_4)-alkoxy-(C_1-C_4)-alkoxy, (C_1-C_4)-alkylhydroxyimino, (C_1-C_4)-alkoxyimino, (C_1-C_4)-alkyl-(C_1-C_4)-alkoxyimino, (C_1-C_4)-haloalkyl-(C_1-C_4)-alkoxyimino, (C_1-

C_4)-alkylthio, (C_1-C_4)-haloalkylthio, (C_1-C_4)-alkylthio-(C_1-C_4)-alkyl, (C_1-C_4)-alkylsulfinyl, (C_1-C_4)-haloalkylsulfinyl, (C_1-C_4)-alkylsulfinyl-(C_1-C_4)-alkyl, (C_1-C_4)-alkylsulfonyl, (C_1-C_4)-haloalkylsulfonyl, (C_1-C_4)-alkylsulfonyl-(C_1-C_4)-alkyl, (C_1-C_4)-alkylsulfonyloxy, (C_1-C_4)-alkylcarbonyl, (C_1-C_4)-haloalkylcarbonyl, aminocarbonyl, (C_1-C_4)-alkylaminocarbonyl, di-(C_1-C_4)-alkylpaminocarbonyl, (C_1-C_4)-alkylsulfonylamino, (C_1-C_4)-alkylamino, di-(C_1-C_4)-alkylamino, aminosulfonyl, (C_1-C_4)-alkylaminosulfonyl, di-(C_1-C_4)-alkylaminosulfonyl,

R^5 represents (C_1-C_4)-alkyl, (C_1-C_4)-haloalkyl, (C_1-C_4)-cyanoalkyl, (C_1-C_4)-hydroxyalkyl, (C_1-C_4)-alkoxy-(C_1-C_4)-alkyl, (C_1-C_4)-haloalkoxy-(C_1-C_4)-alkyl, (C_2-C_4)-alkenyl, (C_2-C_4)-alkenyloxy-(C_1-C_4)-alkyl, (C_2-C_4)-haloalkenyloxy-(C_1-C_4)-alkyl, (C_2-C_4)-haloalkenyl, (C_2-C_4)-cyanoalkenyl, (C_2-C_4)-alkynyl, (C_2-C_4)-alkynyloxy-(C_1-C_4)-alkyl, (C_2-C_4)-haloalkynyl, (C_3-C_6)-cycloalkyl, (C_3-C_6)-cycloalkyl-(C_3-C_6)cycloalkyl, (C_1-C_4)-alkyl-(C_3-C_6)cycloalkyl, halo-(C_3-C_6)-cycloalkyl, (C_1-C_4)-alkylthio-(C_1-C_4)-alkyl, (C_1-C_4)-haloalkylthio-(C_1-C_4)-alkyl, (C_1-C_4)-alkylsulfinyl-(C_1-C_4)-alkyl, (C_1-C_4)-haloalkylsulfinyl-(C_1-C_4)-alkyl, (C_1-C_4)-alkylsulfonyl-(C_1-C_4)-alkyl, (C_1-C_4)-haloalkylsulfonyl-(C_1-C_4)-alkyl, (C_1-C_4)-alkoxy-(C_1-C_4)-alkylthio-(C_1-C_4)-alkyl or (C_1-C_4)-alkylcarbonyl-(C_1-C_4)-alkyl,

R^7 represents hydrogen or represents (C_1-C_6)-alkyl, (C_1-C_6)-alkoxy-(C_1-C_6)-alkyl, (C_2-C_6)-alkenyl, (C_2-C_6)-alkynyl, (C_3-C_6)-cycloalkyl, (C_3-C_{12})-cycloalkyl-(C_1-C_6)-alkyl or (C_4-C_{12})-bicycloalkyl, each of which is optionally mono- or polysubstituted by identical or different substituents, where the substituents independently of one another may be selected from the group consisting of halogen, cyano, (C_1-C_6)-alkyl, (C_1-C_4)-haloalkyl, (C_3-C_6)-cycloalkyl, (C_1-C_4)-alkoxy, (C_1-C_4)-haloalkoxy, (C_1-C_4)-alkylthio, (C_1-C_4)-alkylsulfinyl, (C_1-C_4)-alkylsulfonyl, (C_2-C_6)-alkoxycarbonyl, (C_2-C_6)-alkylcarbonyl, a phenyl ring or a 3- or 6-membered aromatic, partially saturated or saturated heterocycle, where the phenyl ring or heterocycle may in each case optionally be mono- or polysubstituted by identical or different substituents, and where the substituents independently of one another may be selected from the group consisting of (C_1-C_6)-alkyl, (C_2-C_6)-alkenyl, (C_2-C_6)-alkynyl, (C_3-C_6)-cycloalkyl, (C_1-C_6)-haloalkyl, (C_2-C_6)-haloalkenyl, (C_2-C_6)-haloalkynyl, (C_3-C_6)-halocycloalkyl, halogen, cyano, (C_1-C_4)-alkoxy, (C_1-C_4)-haloalkoxy, (C_1-C_4)-alkylthio, (C_1-C_4)-alkylsulfinyl, (C_1-C_4)-alkylsulfonyl, (C_1-C_4)-haloalkylthio, (C_1-C_4)-haloalkylsulfinyl, (C_1-C_4)-haloalkylsulfonyl, (C_1-C_6-alkyl)carbonyl, (C_1-C_6-alkoxy)carbonyl, aminocarbonyl, (C_1-C_6-alkyl)aminocarbonyl, di-(C_1-C_4-alkyl)aminocarbonyl,

R^8 represents amino or (C_1-C_6)-alkylamino, di-(C_1-C_4)-alkylamino, (C_2-C_6)-alkenylamino, (C_2-C_6)-alkynylamino, (C_3-C_{12})-cycloalkylamino, (C_3-C_{12})-cycloalkyl-(C_1-C_6)-alkylamino, (C_4-C_{12})-bicycloalkylamino or hydrazino, each of which is optionally mono- or polysubstituted by identical or different substituents, where the substituents independently of one another may be selected from the group consisting of halogen, cyano, amino, nitro, hydroxy, (C=O)OH, (C_1-C_6)-

2017340690 07 Apr 2021

alkyl, (C_3-C_6)-cycloalkyl, (C_1-C_4)-alkoxy, (C_1-C_4)-haloalkoxy, (C_1-C_4)-alkylthio, (C_1-C_4)-haloalkylthio, (C_1-C_4)-alkylsulfinyl, (C_1-C_4)-haloalkylsulfinyl, (C_1-C_4)-alkylsulfonyl, (C_1-C_4)-haloalkylsulfonyl, (C_2-C_6)-alkoxycarbonyl, (C_2-C_6)-alkylcarbonyl, (C_1-C_6)-haloalkylcarbonyl, (C_1-C_6)-alkylcarbonylamino, aminocarbonyl, (C_1-C_6)-alkylaminocarbonyl, di-(C_1-C_6)-alkylaminocarbonyl, (C_1-C_4)-alkylamino, di-(C_1-C_4)-alkylamino, (C_3-C_6)-cycloalkylamino, aminosulfonyl, (C_1-C_6)-alkylaminosulfonyl, di-(C_1-C_6)-alkylaminosulfonyl, sulfonylamino, (C_1-C_6)-alkylsulfonylamino, di-(C_1-C_6)-alkylsulfonylamino, a phenyl ring or a 3- to 6-membered aromatic, partially saturated or saturated heterocycle, where the phenyl ring or heterocycle may in each case optionally be mono- or polysubstituted by identical or different substituents, and where the substituents independently of one another may be selected from the group consisting of (C_1-C_6)-alkyl, (C_2-C_6)-alkenyl, (C_2-C_6)-alkynyl, (C_3-C_6)-cycloalkyl, (C_1-C_6)-haloalkyl, (C_2-C_6)-haloalkenyl, (C_2-C_6)-haloalkynyl, (C_3-C_6)-halocycloalkyl, halogen, cyano, (C=O)OH, NO_2, OH, (C_1-C_4)-alkoxy, (C_1-C_4)-haloalkoxy, (C_1-C_4)-alkylthio, (C_1-C_4)-alkylsulfinyl, (C_1-C_4)-alkylsulfonyl, (C_1-C_4)-haloalkylthio, (C_1-C_4)-haloalkylsulfinyl, (C_1-C_4)-haloalkylsulfonyl, aminosulfonyl, (C_1-C_6)-alkylaminosulfonyl, di-(C_1-C_6)-alkylaminosulfonyl, (C_1-C_6)-alkylcarbonyl, (C_1-C_6)-alkoxycarbonyl, aminocarbonyl, (C_1-C_6)-alkylaminocarbonyl, di-(C_1-C_4)-alkylaminocarbonyl,

or

R^8 furthermore represents a 3- to 6-membered aromatic, partially saturated or saturated heterocycle which is attached via a nitrogen atom and where the heteroatoms are selected from the group consisting of N, S, O, where in each case at least one carbonyl group may be present and/or the heterocycle may in each case optionally be mono- or polysubstituted by identical or different substituents, where the substituents independently of one another may be selected from the group consisting of (C_1-C_6)-alkyl, (C_2-C_6)-alkenyl, (C_2-C_6)-alkynyl, (C_3-C_6)-cycloalkyl, (C_1-C_6)-haloalkyl, (C_2-C_6)-haloalkenyl, (C_2-C_6)-haloalkynyl, (C_3-C_6)-halocycloalkyl, halogen, cyano, (C=O)OH, NO_2, OH, (C_1-C_4)-alkoxy, (C_1-C_4)-haloalkoxy, (C_1-C_4)-alkylthio, (C_1-C_4)-alkylsulfinyl, (C_1-C_4)-alkylsulfonyl, (C_1-C_4)-haloalkylthio, (C_1-C_4)-haloalkylsulfinyl, (C_1-C_4)-haloalkylsulfonyl, aminosulfonyl, (C_1-C_6)-alkylaminosulfonyl, di-(C_1-C_6)-alkylaminosulfonyl, amino, (C_1-C_4)-alkylamino, di-(C_1-C_4)-alkylamino, (C_3-C_6)-cycloalkylamino, (C_1-C_6)-alkylcarbonyl, (C_1-C_6)-alkoxycarbonyl, aminocarbonyl, (C_1-C_6)-alkylaminocarbony or di-(C_1-C_4)-alkylaminocarbonyl, and

n represents 0, 1 or 2.

3. A compound of the formula (I) according to Claim 1 or 2, in which

A^1 represents nitrogen or $=C(R^4)$-,

A^2 represents $-N(R^5)$- or oxygen,

A^3 represents oxygen or sulfur,

R^1 represents (C_1-C_4)-alkyl, (C_1-C_4)-hydroxyalkyl, (C_1-C_4)-haloalkyl, (C_2-C_4)-alkenyl, (C_2-C_4)-haloalkenyl, (C_2-C_4)-alkynyl, (C_2-C_4)-haloalkynyl, (C_3-C_6)-cycloalkyl, (C_1-C_4)-alkylthio-(C_1-C_4)-alkyl, (C_1-C_4)-alkylsulfinyl-(C_1-C_4)-alkyl or (C_1-C_4)-alkylsulfonyl-(C_1-C_4)-alkyl,

R^2 represents hydrogen, cyano, halogen, (C_1-C_4)-alkyl, (C_1-C_4)-haloalkyl, (C_1-C_4)-haloalkoxy, (C_1-C_4)-alkylthio, (C_1-C_4)-alkylsulfinyl, (C_1-C_4)-alkylsulfonyl, (C_1-C_4)-haloalkylthio, (C_1-C_4)-haloalkylsulfinyl or (C_1-C_4)-haloalkylsulfonyl,

R^3 represents hydrogen, halogen, (C_1-C_4)-alkyl, (C_1-C_4)-haloalkyl, (C_1-C_4)-haloalkoxy, (C_1-C_4)-alkylthio, (C_1-C_4)-alkylsulfinyl, (C_1-C_4)-alkylsulfonyl, (C_1-C_4)-haloalkylthio, (C_1-C_4)-haloalkylsulfinyl or (C_1-C_4)-haloalkylsulfonyl,

R^4 represents hydrogen, halogen, cyano or (C_1-C_4)-alkyl,

R^5 represents (C_1-C_4)-alkyl or (C_1-C_4)-alkoxy-(C_1-C_4)-alkyl,

R^6 represents hydrogen, cyano, halogen, (C_1-C_4)-alkyl, (C_2-C_4)-alkenyl, (C_2-C_4)-alkynyl, (C_1-C_4)-haloalkyl, (C_3-C_6)-cycloalkyl, (C_1-C_4)-alkyl-(C_3-C_6)-cycloalkyl, (C_1-C_4)-alkoxy, (C_1-C_4)-haloalkoxy, (C_1-C_4)-alkylthio, (C_1-C_4)-haloalkylthio, (C_1-C_4)-alkylsulfinyl, (C_1-C_4)-haloalkylsulfinyl, (C_1-C_4)-alkylsulfonyl, (C_1-C_4)-haloalkylsulfonyl or (C_1-C_4)-alkylcarbonyl,

R^7 represents hydrogen or represents (C_1-C_4)-alkyl or (C_1-C_4)-alkoxy-(C_1-C_4)-alkyl, each of which is optionally mono- or polysubstituted by identical or different substituents from the group consisting of halogen, (C_1-C_2)-haloalkyl, cyano, phenyl and pyridyl, where phenyl and pyridyl may each optionally be mono- or disubstituted by identical or different substituents from the group consisting of (C_1-C_4)-alkyl, halogen and cyano,

R^8 represents amino or (C_1-C_4)-alkylamino, di-(C_1-C_4)-alkylamino, (C_2-C_6)-alkenylamino, (C_2-C_4)-alkynylamino, (C_3-C_6)-cycloalkylamino or hydrazino, each of which is optionally mono- or polysubstituted by identical or different substituents, where the substituents independently of one another may be selected from the group consisting of halogen, cyano, (C_1-C_4)-alkyl, (C_3-C_6)-cycloalkyl, (C_1-C_4)-alkoxy, (C_1-C_4)-haloalkoxy, (C_1-C_4)-alkylthio, (C_1-C_4)-haloalkylthio, (C_1-C_4)-alkylsulfinyl, (C_1-C_4)-haloalkylsulfinyl, (C_1-C_4)-alkylsulfonyl, (C_1-C_4)-haloalkylsulfonyl, (C_1-C_4)-alkoxycarbonyl, (C_1-C_4)-alkylcarbonyl, (C_1-C_6)-haloalkylcarbonyl, (C_1-C_4)-alkylcarbonylamino, aminocarbonyl, (C_1-C_6)-alkylaminocarbonyl, di-(C_1-C_6)-alkylaminocarbonyl, a phenyl ring or a 3- to 6-membered aromatic, partially saturated or saturated heterocycle, where the phenyl ring or heterocycle may in each case optionally be mono- or polysubstituted by identical or different substituents, and where the substituents independently of one another may be selected from the group consisting of (C_1-C_4)-alkyl, (C_3-C_6)-cycloalkyl, (C_1-

2017340690 07 Apr 2021

C_4)-haloalkyl, halogen, cyano, (C_1-C_4)-alkoxy, (C_1-C_4)-haloalkoxy, (C_1-C_4)-alkylthio, (C_1-C_4)-alkylsulfinyl, (C_1-C_4)-alkylsulfonyl, (C_1-C_4)-haloalkylthio, (C_1-C_4)-haloalkylsulfinyl, (C_1-C_4)-haloalkylsulfonyl,

or

R^8 furthermore represents a 3- to 6-membered aromatic, partially saturated or saturated heterocycle which is attached via a nitrogen atom and where the heteroatoms are selected from the group consisting of N, S, O, where in each case at least one carbonyl group may be present and/or the heterocycle may in each case optionally be mono- or polysubstituted by identical or different substituents, where the substituents independently of one another may be selected from the group consisting of (C_1-C_4)-alkyl, (C_3-C_6)-cycloalkyl, (C_1-C_6)-haloalkyl, halogen, cyano, (C_1-C_4)-alkoxy, (C_1-C_4)-haloalkoxy, (C_1-C_4)-alkylthio, (C_1-C_4)-alkylsulfinyl, (C_1-C_4)-alkylsulfonyl, (C_1-C_4)-haloalkylthio, (C_1-C_4)-haloalkylsulfinyl, (C_1-C_4)-haloalkylsulfonyl, and

n represents 0, 1 or 2.

4. A compound of the formula (I) according to any one of Claims 1 to 3, in which

A^1 represents nitrogen or $=C(R^4)$-,

A^2 represents $-N(R^5)$- or oxygen,

A^3 represents oxygen or sulfur,

R^1 represents methyl, ethyl, n-propyl, isopropyl, cyclopropyl, n-butyl, isobutyl, tert-butyl, cyclobutyl, fluoromethyl, difluoromethyl, trifluoromethyl, fluoroethyl, difluoroethyl, trifluoroethyl, tetrafluoroethyl or pentafluoroethyl,

R^2 represents hydrogen, methyl, ethyl, fluorine, chlorine, bromine, cyano, fluoromethyl, difluoromethyl, trifluoromethyl, fluoroethyl, difluoroethyl, trifluoroethyl, tetrafluoroethyl, pentafluoroethyl, trifluoromethoxy, difluorochloromethoxy, dichlorofluoromethoxy, trifluoromethylthio, trifluoromethylsulfinyl or trifluoromethylsulfonyl,

R^3 represents fluorine, chlorine, fluoromethyl, difluoromethyl, trifluoromethyl, fluoroethyl, difluoroethyl, trifluoroethyl, tetrafluoroethyl, pentafluoroethyl, trifluoromethoxy, difluorochloromethoxy, dichlorofluoromethoxy, trifluoromethylthio, trifluoromethylsulfinyl or trifluoromethylsulfonyl,

R^4 represents hydrogen, fluorine, chlorine, bromine or cyano,

R^5 represents methyl, ethyl, isopropyl, methoxymethyl or methoxyethyl,

2017340690 07 Apr 2021

R^6 represents hydrogen,

R^7 represents hydrogen, methyl, ethyl, isopropyl, tert-butyl, methoxymethyl or methoxyethyl,

R^8 represents amino or represents methylamino, dimethylamino, ethylamino, isopropylamino, diethylamino, methylethylamino, propylamino, methylpropylamino, ethylpropylamino, methoxyethylamino, cyanoethylamino, methylthioethylamino, methylsulfinylethylamino, methylsulfonylethylamino, cyclopropylamino, cyclobutylamino, methylcyclopropylamino, methylcyclobutylamino, methylhydrazino, dimethylhydrazino, trimethylhydrazino or phenylhydrazino,

or

R^8 furthermore represents aziridinyl, azetidinyl, pyrrolidinyl, pyrazolidinyl, imidazolidinyl, thiazolidinyl, oxazolidinyl, piperidinyl, piperazinyl, morpholinyl, thiomorpholinyl, pyrrolidonyl, imidazolidonyl, triazolinonyl, tetrazolinonyl, piperidonyl, pyrrolyl, pyrazolyl, triazolyl, imidazolyl or oxazolyl, attached via a nitrogen atom, in each case optionally mono- or polysubstituted by identical or different substituents from the group consisting of methyl, ethyl, trifluoromethyl, fluorine, chlorine, bromine and cyano, and

n represents 0, 1 or 2.

5. A compound of the formula (I) according to any one of Claims 1 to 4, in which

A^1 represents nitrogen,

A^2 represents $-N(R^5)-$,

A^3 represents oxygen,

R^1 represents ethyl,

R^2 represents hydrogen, methyl or trifluoromethyl,

R^3 represents trifluoromethyl, pentafluoroethyl, trifluoromethylthio, trifluoromethylsulfinyl or trifluoromethylsulfonyl,

R^5 represents methyl,

R^6 represents hydrogen,

R^7 represents hydrogen or methyl,

2017340690 07 Apr 2021

R^8 represents amino, methylamino, dimethylamino, ethylamino, isopropylamino, cyclopropylamino, methoxyethylamino, cyanoethylamino, methylthioethylamino, methylsulfinylethylamino or methylsulfonylethylamino,

or

R^8 furthermore represents pyrrolidinyl, attached via a nitrogen atom, or represents pyrazolyl, attached via a nitrogen atom and optionally monosubstituted by bromine,

n represents 0, 1 or 2.

6. A compound of the formula (I) according to any one of Claims 1 to 5, in which

A^1 represents nitrogen,

A^2 represents –N-(R^5)-,

A^3 represents oxygen,

R^1 represents ethyl,

R^2 represents hydrogen or methyl,

R^3 represents trifluoromethyl,

R^5 represents methyl,

R^6 represents hydrogen,

R^7 represents hydrogen or methyl,

R^8 represents methylamino (-$NHCH_3$), ethylamino (-$NHCH_2CH_3$), isopropylamino (-$NHiC_3H_7$), methoxyethylamino (-$NHCH_2CH_2OCH_3$), cyanoethylamino (-$NHCH_2CH_2CN$), methylthioethylamino (-$NHCH_2CH_2SCH_3$), methylsulfinylethylamino (-$NHCH_2CH_2SOCH_3$), methylsulfonylethylamino (-$NHCH_2CH_2SO_2CH_3$) or dimethylamino (-$N(CH_3)_2$),

or

R^8 furthermore represents pyrrolidinyl, attached via a nitrogen atom, or represents pyrazolyl, attached via a nitrogen atom and optionally monosubstituted by bromine, and

n represents 2.

7. A compound of the formula (I) according to any one of Claims 1 to 6, in which

2017340690 07 Apr 2021

A^1 represents nitrogen,

A^2 represents –N-(R^5)-,

A^3 represents oxygen,

R^1 represents ethyl,

R^2 represents hydrogen or methyl,

R^3 represents trifluoromethyl,

R^5 represents methyl,

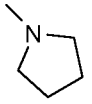
R^6 represents hydrogen,

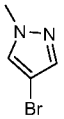
R^7 represents hydrogen or methyl,

R^8 represents methylamino (-$NHCH_3$), ethylamino (-$NHCH_2CH_3$), isopropylamino (-$NHiC_3H_7$), methoxyethylamino (-$NHCH_2CH_2OCH_3$), cyanoethylamino (-$NHCH_2CH_2CN$), methylthioethylamino (-$NHCH_2CH_2SCH_3$), methylsulfinylethylamino (-$NHCH_2CH_2SOCH_3$), methylsulfonylethylamino (-$NHCH_2CH_2SO_2CH_3$) or dimethylamino (-$N(CH_3)_2$),

or

R^8 furthermore represents pyrrolidinyl, attached via a nitrogen atom, of the formula below:



or represents pyrazolyl, attached via a nitrogen atom and monosubstituted by bromine, of the formula:  , and

n represents 2.

8. Agrochemical formulation comprising a compound of the formula (I) according to any one of Claims 1 to 7 and one or more extenders and/or surfactants.

9. Agrochemical formulation according to Claim 8, additionally comprising a further agrochemically active compound.

10. Method for controlling animal pests, wherein a compound of the formula (I) according to any one of Claims 1 to 7 or an agrochemical formulation according to Claim 8 or 9 is allowed to act on the animal pests and/or their habitat.

2017340690 07 Apr 2021

11. Use of a compound of the formula (I) according to any one of Claims 1 to 7 or of an agrochemical formulation according to Claim 8 or 9 for controlling animal pests.