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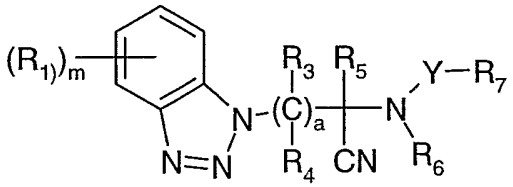
(54) Title: ORGANIC COMPOUNDS

(57) Abstract: The invention relates to compounds of the general formula: (I); wherein R_1, R_3, R_4, R_5, R_6, R_7, Y, a and m have the significances given in claim 1, and optionally the enantiomers thereof. The active ingredients have advantageous pesticidal properties. They are especially suitable for controlling parasites on warm-blooded animals.

BENZOTRIAZOL-1-YL-AMINOACETONITRILE CMOPOUNDS AND THEIR USXE IN THE CONTROL OF PARASITE DISEASE

The present invention relates to new benzotriazolyl-aminoacetonitrile compounds of formula



I,

wherein

R_1 signifies halogen, cyano, nitro, C_1-C_6-alkyl, C_3-C_6-cycloalkyl, halo-C_1-C_6-alkyl, C_1-C_6-alkylthio, arylthio, C_1-C_6-alkoxy, C_3-C_6-cycloalkyloxy, halo-C_1-C_6-alkoxy, C_1-C_6-alkylcarbonyl, halo-C_1-C_6-alkylcarbonyl, C_1-C_6-alkylsulfinyl, C_1-C_6-alkylsulfonyl, C_1-C_6-alkylamino, di(C_1-C_6-alkyl)amino, unsubstituted or substituted aryl or unsubstituted or substituted phenoxy, whereby the substituents may each be independent of one another and are selected from the group consisting of halogen, nitro, cyano, C_1-C_6-alkyl, halo-C_1-C_6-alkyl, C_1-C_6-alkoxy, halo-C_1-C_6-alkoxy, C_1-C_6-alkylthio, halo-C_1-C_6-alkylthio, C_1-C_6-alkylsulfinyl, halo-C_1-C_6-alkylsulfinyl, C_1-C_6-alkylsulfonyl and halo-C_1-C_6-alkylsulfonyl;

R_3, R_4 und R_5 either, independently of one another, signify hydrogen, halogen, C_1-C_6-alkyl, halo-C_1-C_6-alkyl; C_3-C_6-cycloalkyl that is either unsubstituted or substituted once or many times, whereby the substituents may be independent of one another and are selected from the group consisting of halogen and C_1-C_6-alkyl; phenyl that is either unsubstituted or substituted once or many times, whereby the substituents may be independent of one another and are selected from the group consisting of halogen, nitro, cyano, C_1-C_6-alkyl, halo-C_1-C_6-alkyl, C_1-C_6-alkoxy, halo-C_1-C_6-alkoxy, C_1-C_6-alkylthio, halo-C_1-C_6-alkylthio, C_1-C_6-alkylsulfinyl, halo-C_1-C_6-alkylsulfinyl, C_1-C_6-alkylsulfonyl, halo-C_1-C_6-alkylsulfonyl, C_1-C_6-alkylamino or di-(C_1-C_6-alkyl)amino;
or R_4 and R_5 together signify C_2-C_6-alkylene;

R_6 signifies hydrogen, C_1-C_6-alkyl, C_1-C_6-alkylcarbonyl, C_1-C_6-alkoxy-C_1-C_6-alkyl, aminocarbonyl, C_1-C_6-alkoxycarbonyl, halo-C_1-C_6-alkylcarbonyl, thio-C_1-C_6-alkylcarbonyl or benzyl;

R_7 signifies hydrogen, C_1-C_6-alkyl, C_1-C_6-alkoxy, C_1-C_6-alkylamino, di(C_1-C_6-alkyl)amino, piperonyl, phenyl which is unsubstituted or substituted once or many times, whereby the

substituents may be independent of one another and are selected from the group consisting of halogen, nitro, cyano, C_1-C_6-alkyl, C_3-C_6-cycloalkyl, halo-C_1-C_6-alkyl, C_1-C_6-alkoxy, C_3-C_6-cycloalkyloxy, halo-C_1-C_6-alkoxy, C_2-C_6-alkenyl, halo-C_2-C_6-alkenyl, C_2-C_6-alkinyl, C_3-C_6-cycloalkyl, C_2-C_6-alkenyloxy, halo-C_2-C_6-alkenyloxy, C_1-C_6-alkylthio, halo-C_1-C_6-alkylthio, C_1-C_6-alkylsulfonyloxy, halo-C_1-C_6-alkylsulfonyloxy, C_1-C_6-alkylsulfinyl, halo-C_1-C_6-alkylsulfinyl, C_1-C_6-alkylsulfonyl, halo-C_1-C_6-alkylsulfonyl, C_2-C_6-alkenylthio, halo-C_2-C_6-alkenylthio, C_2-C_6-alkenylsulfinyl, halo-C_2-C_6-alkenylsulfinyl, C_2-C_6-alkenylsulfonyl, halo-C_2-C_6-alkenylsulfonyl, C_1-C_6-alkylamino, di(C_1-C_6-alkyl)amino, C_1-C_6-alkylsulfonylamino, halo-C_1-C_6-alkylsulfonylamino, C_1-C_6-alkylcarbonyl, halo-C_1-C_6-alkylcarbonyl, C_1-C_6-alkoxycarbonyl, C_1-C_6-alkylaminocarbonyl, di(C_1-C_6-alkyl)aminocarbonyl; aryl-C_1-C_6-alkyl which is unsubstituted or substituted once or many times, arylamino which is unsubstituted or substituted once or many times, arylcarbonyl which is unsubstituted or substituted once or many times, arylcarbonyloxy which is unsubstituted or substituted once or many times, aryloxy which is unsubstituted or substituted once or many times, aryloxy-C_1-C_6-alkyl which is unsubstituted or substituted once or many times, hetaryloxy-C_1-C_6-alkyl which is unsubstituted or substituted once or many times, aryloxycarbonyl which is unsubstituted or substituted once or many times, arylsulfonyl which is unsubstituted or substituted once or many times, arylsulfonylamino which is unsubstituted or substituted once or many times, pyridyloxy which is unsubstituted or substituted once or many times, and phenylacetylenyl which is unsubstituted or substituted once or many times, whereby the substituents may each be independent of one another and are selected from the group consisting of halogen, nitro, cyano, C_1-C_6-alkyl, halo-C_1-C_6-alkyl, C_1-C_6-alkoxy, halo-C_1-C_6-alkoxy, C_1-C_6-alkylthio, halo-C_1-C_6-alkylthio, C_1-C_6-alkylsulfinyl, halo-C_1-C_6-alkylsulfinyl, C_1-C_6-alkylsulfonyl and halo-C_1-C_6-alkylsulfonyl;

unsubstituted hetaryl or hetaryl which is substituted once or many times, whereby the substituents may be independent of one another and are selected from the group consisting of halogen, nitro, cyano, C_1-C_6-alkyl, halo-C_1-C_6-alkyl, C_1-C_6-alkoxy, halo-C_1-C_6-alkoxy, C_2-C_6-alkenyloxy, halo-C_2-C_6-alkenyloxy, C_1-C_6-alkylthio, halo-C_1-C_6-alkylthio, C_1-C_6-alkylsulfinyl, halo-C_1-C_6-alkylsulfinyl, C_2-C_6-alkenylthio, halo-C_2-C_6-alkenylthio, C_2-C_6-alkenylsulfinyl, halo-C_2-C_6-alkenylsulfinyl, C_1-C_6-alkylsulfonyl and halo-C_1-C_6-alkylsulfonyl, C_2-C_6-alkenylsulfonyl, halo-C_2-C_6-alkenylsulfonyl, C_1-C_6-alkylamino and di-(C_1-C_6-alkyl)amino;

or naphthyl or quinolyl which are unsubstituted or substituted once or many times, whereby the substituents may be independent of one another and are selected from the group consisting of halogen, nitro, cyano, C_1-C_6-alkyl, halo-C_1-C_6-alkyl, C_1-C_6-alkoxy, halo-C_1-C_6-

alkoxy, C_2-C_6-alkenyloxy, halo-C_2-C_6-alkenyloxy, C_1-C_6-alkylthio, halo-C_1-C_6-alkylthio, C_1-C_6-alkylsulfinyl, halo-C_1-C_6-alkylsulfinyl, C_2-C_6-alkenylthio, halo-C_2-C_6-alkenylthio, C_2-C_6-alkenylsulfinyl, halo-C_2-C_6-alkenylsulfinyl, C_1-C_6-alkylsulfonyl, halo-C_1-C_6-alkylsulfonyl, C_2-C_6-alkenylsulfonyl, halo-C_2-C_6-alkenylsulfonyl, C_1-C_6-alkylamino and di-(C_1-C_6-alkyl)amino;

R_8 and R_9, independently of one another, signify hydrogen, C_1-C_6-alkyl, C_1-C_6-alkoxycarbonyl, C_1-C_6-alkylcarbonyl, C_1-C_6-alkylthiocarbonyl, thio-C_1-C_6-alkylcarbonyl, aryl or hetaryl;

Y signifies a direct bond, C(O), C(S) or $S(O)_n$;

a signifies 1, 2 or 3;

m signifies 0, 1, 2, 3 or 4; and

n is 1 or 2;

their preparation and use in the control of endo- and ectoparasites, especially helminths, in and on warm-blooded productive livestock and domestic animals and plants, and furthermore pesticides containing at least one of these compounds.

Substituted aminoacetonitrile compounds having pesticidal activity are described for example in EP-0.953.565 A2. However, the active ingredients specifically disclosed therein cannot always fulfil the requirements regarding potency and activity spectrum. There is therefore a need for active ingredients with improved pesticidal properties. It has now been found that the aminoacetonitrile compounds of formula I have excellent pesticidal properties, especially against endo- and ecto-parasites in and on productive livestock and domestic animals and plants.

Aryl is phenyl or naphthyl.

Hetaryl is pyridyl, pyrimidyl, s-triazinyl, 1,2,4-triazinyl, thienyl, furanyl, pyrryl, pyrazolyl, imidazolyl, thiazolyl, triazolyl, oxazolyl, thiadiazolyl, oxadiazolyl, benzothienyl, benzofuranyl, benzothiazolyl, indolyl or indazolyl, preferably pyridyl, pyrimidyl, s-triazinyl or 1,2,4-triazinyl, especially pyridyl or pyrimidyl.

Alkyl - as a group *per se* and as structural element of other groups and compounds, for example halogen-alkyl, alkoxy, and alkylthio - is, in each case with due consideration of the specific number of carbon atoms in the group or compound in question, either straight-chained, i.e. methyl, ethyl, propyl, butyl, pentyl or hexyl, or branched, e.g. isopropyl, isobutyl, sec.-butyl, tert.-butyl, isopentyl, neopentyl or isohexyl.

Alkenyl - as a group *per se* and as structural element of other groups and compounds - is, in each case with due consideration of the specific number of carbon atoms in the group or compound in question and of the conjugated or isolated double bonds - either straight-chained, e.g. allyl, 2-butenyl, 3-pentenyl, 1-hexenyl or 1,3-hexadienyl, or branched, e.g. isopropenyl, isobutenyl, isoprenyl, tert.-pentenyl or isohexenyl.

Alkinyl - as a group *per se* and as structural element of other groups and compounds - is, in each case with due consideration of the specific number of carbon atoms in the group or compound in question and of the conjugated or isolated double bonds - either straight-chained, e.g. propargyl, 2-butinyl, 3-pentinyl, 1-hexinyl, 1-heptinyl or 3-hexen-1-inyl, or branched, e.g. 3-methylbut-1-inyl, 4-ethylpent-1-inyl or 4-methylhex-2-inyl.

Cycloalkyl - as a group *per se* and as structural element of other groups and compounds such as halocycloalkyl, - is, in each case with due consideration of the specific number of carbon atoms in the group or compound in question, cyclopropyl, cyclobutyl, cyclopentyl or cyclohexyl.

Halogen - as a group *per se* and as structural element of other groups and compounds such as haloalkyl, haloalkoxy and haloalkylthio - is fluorine, chlorine, bromine or iodine, especially fluorine, chlorine or bromine, in particular fluorine or chlorine.

Halogen-substituted carbon-containing groups and compounds, such as haloalkyl, haloalkoxy or haloalkylthio, may be partially halogenated or perhalogenated, whereby in the case of multiple halogenation, the halogen substituents may be identical or different. Examples of halogen-alkyl - as a group *per se* and as structural element of other groups and compounds such as haloalkoxy or haloalkylthio, - are methyl which is mono- to trisubstituted by fluorine, chlorine and/or bromine, such as CHF_2 or CF_3; ethyl which is mono- to pentasubstituted by fluorine, chlorine and/or bromine, such as CH_2CF_3, CF_2CF_3, CF_2CCl_3, CF_2CHCl_2, CF_2CHF_2, CF_2CFCl_2, CF_2CHBr_2, CF_2CHClF, CF_2CHBrF or $CClFCHClF$; propyl or isopropyl, mono- to heptasubstituted by fluorine, chlorine and/or bromine, such as $CH_2CHBrCH_2Br$, CF_2CHFCF_3, $CH_2CF_2CF_3$ or $CH(CF_3)_2$; butyl or one of its isomers, mono- to nonasubstituted by fluorine, chlorine and/or bromine, such as $CF(CF_3)CHFCF_3$ or $CH_2(CF_2)_2CF_3$; pentyl or one of its isomers substituted once to eleven times by fluorine, chlorine and/or bromine, such as $CF(CF_3)(CHF)_2CF_3$ or $CH_2(CF_2)_3CF_3$; and hexyl or one of its isomers substituted once to thirteen times by fluorine, chlorine and/or bromine, such as $(CH_2)_4CHBrCH_2Br$, $CF_2(CHF)_4CF_3$, $CH_2(CF_2)_4CF_3$ or $C(CF_3)_2(CHF)_2CF_3$.

Alkoxy groups preferably have a chain length of 1 to 6 carbon atoms. Alkoxy is for example methoxy, ethoxy, propoxy, isopropoxy, n-butoxy, isobutoxy, sec.-butoxy and tert.-butoxy, as well as the isomers pentyloxy and hexyloxy; preferably methoxy and ethoxy. Haloalkoxy groups preferably have a chain length of 1 to 6 carbon atoms. Haloalkoxy is e.g. fluoromethoxy, difluoromethoxy, trifluoromethoxy, 2,2,2-trifluoroethoxy, 1,1,2,2-tetrafluoroethoxy, 2-fluoroethoxy, 2-chloroethoxy, 2,2-difluoroethoxy and 2,2,2-trichloroethoxy; preferably difluoromethoxy, 2-chloroethoxy and trifluoromethoxy.

Alkylthio groups preferably have a chain length of 1 to 6 carbon atoms. Alkylthio is for example methylthio, ethylthio, propylthio, isopropylthio, n-butylthio, isobutylthio, sec.-butylthio or tert.-butylthio, preferably methylthio and ethylthio.

Preferred embodiments within the scope of the invention are:

(1) A compound of formula I, wherein R_1 signifies halogen, cyano, nitro, C_1-C_4-alkyl, halo-C_1-C_4-alkyl, C_1-C_4-alkoxy, halo-C_1-C_4-alkoxy, C_1-C_4-alkylcarbonyl, halo-C_1-C_4-alkylcarbonyl, C_1-C_4-alkylsulfonyl or unsubstituted or substituted phenoxy, whereby the substituents may be independent of one another and are selected from the group consisting of halogen, nitro, cyano, C_1-C_4-alkyl, halo-C_1-C_4-alkyl, C_1-C_4-alkoxy and halo-C_1-C_4-alkoxy;

especially halogen, cyano, nitro, C_1-C_2-alkyl, halo-C_1-C_2-alkyl, C_1-C_2-alkoxy, halo-C_1-C_2-alkoxy or unsubstituted or substituted phenoxy, whereby the substituents may be independent of one another and are selected from the group consisting of halogen, C_1-C_4-alkyl, halo-C_1-C_4-alkyl, C_1-C_4-alkoxy and halo-C_1-C_4-alkoxy;

most particularly halogen, cyano, nitro, C_1-C_2-alkyl, halo-C_1-C_2-alkyl, C_1-C_2-alkoxy or halo-C_1-C_2-alkoxy;

(2) A compound of formula I, wherein R_3, R_4 and R_5 are either, independently of one another, hydrogen, halogen, C_1-C_4-alkyl, halo-C_1-C_4-alkyl, C_3-C_6-cycloalkyl; phenyl that is either unsubstituted or substituted once or many times, whereby the substituents may be independent of one another and are selected from the group consisting of halogen, nitro, cyano, C_1-C_4-alkyl, halo-C_1-C_4-alkyl, C_1-C_4-alkoxy, halo-C_1-C_4-alkoxy; C_1-C_4-alkylthio and halo-C_1-C_4-alkylthio; or R_4 and R_5 together are C_2-C_6-alkylene;

especially, independently of one another, hydrogen, halogen, C_1-C_2-alkyl, halo-C_1-C_2-alkyl or C_3-C_6-cycloalkyl;

most particularly, independently of one another, hydrogen, methyl or halomethyl;

(3) A compound of formula I, wherein R_6 is hydrogen, C_1-C_4-alkyl, C_1-C_4-alkylcarbonyl, C_1-C_6-alkoxy-C_1-C_6-alkyl or benzyl;

especially hydrogen, C_1-C_2-alkyl, C_1-C_2-alkylcarbonyl or benzyl;

most particularly hydrogen or C_1-C_2-alkyl;

(4) A compound of formula I, wherein R_7 signifies phenyl which is unsubstituted or substituted once or many times, whereby the substituents may be independent of one another and are selected from the group consisting of halogen, nitro, cyano, C_1-C_4-alkyl, halo-C_1-C_4-alkyl, C_1-C_4-alkoxy, halo-C_1-C_4-alkoxy, C_2-C_4-alkenyl, halo-C_2-C_4-alkenyl, C_2-C_4-alkinyl, C_3-C_6-cycloalkyl, C_2-C_4-alkenyloxy, halo-C_2-C_4-alkenyloxy, C_1-C_4-alkylthio, halo-C_1-C_4-alkylthio, C_1-C_4-alkylsulfonyloxy, halo-C_1-C_4-alkylsulfonyloxy, C_1-C_4-alkylsulfonyl, halo-C_1-C_4-alkylsulfonyl, C_2-C_4-alkenylsulfonyl, halo-C_2-C_4-alkenylsulfonyl, C_1-C_4-alkylamino, di(C_1-C_4-alkyl)amino, C_1-C_4-alkylcarbonyl, halo-C_1-C_4-alkylcarbonyl, C_1-C_6-alkoxycarbonyl; aryl-C_1-C_4-alkyl which is unsubstituted or substituted once or many times, aryloxy which is unsubstituted or substituted once or many times, aryloxy-C_1-C_4-alkyl which is unsubstituted or substituted once or many times, hetaryloxy-C_1-C_4-alkyl which is unsubstituted or substituted once or many times, aryloxycarbonyl which is unsubstituted or substituted once or many times, arylsulfonyl which is unsubstituted or substituted once or many times, and pyridyloxy which is unsubstituted or substituted once or many times, whereby the substituents may each be independent of one another and are selected from the group consisting of halogen, nitro, cyano, C_1-C_4-alkyl, halo-C_1-C_4-alkyl, C_1-C_4-alkoxy, halo-C_1-C_4-alkoxy, C_{1-4}-alkylthio, halo-C_{1-4}-alkylthio, C_1-C_4-alkylsulfonyl and halo-C_1-C_4-alkylsulfonyl; hetaryl which is unsubstituted or substituted once or many times, whereby the substituents may be independent of one another and are selected from the group consisting of halogen, nitro, cyano, C_1-C_4-alkyl, halo-C_1-C_4-alkyl, C_1-C_4-alkoxy, halo-C_1-C_4-alkoxy, C_2-C_4-alkenyloxy, halo-C_2-C_4-alkenyloxy, C_1-C_4-alkylthio, halo-C_1-C_4-alkylthio, C_1-C_4-alkylsulfonyl and halo-C_1-C_4-alkylsulfonyl; or
naphthyl or quinolyl which are unsubstituted or substituted once or many times, whereby the substituents may be independent of one another and are selected from the group consisting of halogen, nitro, cyano, C_1-C_4-alkyl, halo-C_1-C_4-alkyl, C_1-C_4-alkoxy, halo-C_1-C_4-alkoxy, C_2-C_4-alkenyloxy, halo-C_2-C_4-alkenyloxy, C_1-C_4-alkylthio, halo-C_1-C_4-alkylthio, C_2-C_4-alkenylthio, halo-C_2-C_4-alkenylthio, C_1-C_4-alkylsulfonyl and halo-C_1-C_4-alkylsulfonyl;

in particular aryl which is unsubstituted or substituted once or many times, whereby the substituents may be independent of one another and are selected from the group consisting

of halogen, nitro, cyano, C_1-C_2-alkyl, halo-C_1-C_2-alkyl, C_1-C_2-alkoxy, halo-C_1-C_2-alkoxy, C_3-C_5-cycloalkyl, C_1-C_2-alkylthio, halo-C_1-C_2-alkylthio, C_1-C_2-alkylsulfonyl, halo-C_1-C_2-alkylsulfonyl, C_1-C_2-alkylcarbonyl, halo-C_1-C_2-alkylcarbonyl, C_1-C_2-alkoxycarbonyl; aryl-C_1-C_2-alkyl which is unsubstituted or substituted once or many times, aryloxy which is unsubstituted or substituted once or many times, aryloxy-C_1-C_2-alkyl which is unsubstituted or substituted once or many times, and pyridyloxy which is unsubstituted or substituted once or many times, whereby the substituents may be independent of one another and are selected from the group consisting of halogen, nitro, cyano, C_1-C_2-alkyl, halo-C_1-C_2-alkyl, C_1-C_2-alkoxy, halo-C_1-C_2-alkoxy, C_1-C_2-alkylthio, halo-C_1-C_2-alkylthio, C_1-C_2-alkylsulfonyl and halo-C_1-C_2-alkylsulfonyl; or

hetaryl which is unsubstituted or substituted once or many times, whereby the substituents may be independent of one another and are selected from the group consisting of halogen, nitro, cyano, C_1-C_2-alkyl, halo-C_1-C_2-alkyl, C_1-C_2-alkoxy, halo-C_1-C_2-alkoxy, C_2-C_4-alkenyloxy, halo-C_2-C_4-alkenyloxy, C_1-C_2-alkylthio, halo-C_1-C_2-alkylthio, C_1-C_2-alkylsulfonyl and halo-C_1-C_2-alkylsulfonyl;

most particularly aryl which is unsubstituted or substituted once or many times, whereby the substituents may be independent of one another and are selected from the group consisting of halogen, cyano, C_1-C_2-alkyl, halo-C_1-C_2-alkyl, C_1-C_2-alkoxy, halo-C_1-C_2-alkoxy, C_3-C_5-cycloalkyl, C_1-C_2-alkylcarbonyl, halo-C_1-C_2-alkylcarbonyl, C_1-C_2-alkoxycarbonyl; aryl-C_1-C_2-alkyl which is unsubstituted or substituted once or many times, and aryloxy-C_1.C_2-alkyl which is unsubstituted or substituted once or many times, whereby the substituents may each be independent of one another and are selected from the group consisting of halogen, cyano, C_1-C_2-alkyl, halo-C_1-C_2-alkyl, C_1-C_2-alkoxy and halo-C_1-C_2-alkoxy;

(5) a compound of formula I, wherein R_8 und R_9 independently of one another, signify hydrogen, C_1-C_6-alkyl, C_1-C_6-alkoxycarbonyl, C_1-C_6-alkylcarbonyl or aryl;

especially, independently of one another, hydrogen or C_1-C_4-alkyl;

most particularly, independently of one another, hydrogen or C_1-C_2-alkyl;

(6) A compound of formula I, wherein Y is C(O) or $S(O)_n$;

especially C(O);

(7) A compound of formula I, wherein a is 1 or 2;

especially 1;

(8) A compound of formula I, wherein m is 1, 2 or 3;

especially 1 or 2;

(9) A compound of formula I, wherein n is 2;

(10) A compound of formula I, wherein

R_1 signifies halogen, cyano, nitro, C_1-C_4-alkyl, halo-C_1-C_4-alkyl, C_1-C_4-alkoxy, halo-C_1-C_4-alkoxy, C_1-C_4-alkylcarbonyl, halo-C_1-C_4-alkylcarbonyl, C_1-C_4-alkylsulfonyl or unsubstituted or substituted phenoxy, whereby the substituents may be independent of one another and are selected from the group consisting of halogen, nitro, cyano, C_1-C_4-alkyl, halo-C_1-C_4-alkyl, C_1-C_4-alkoxy and halo-C_1-C_4-alkoxy;

R_3, R_4 and R_5 , independently of one another, are hydrogen, halogen, C_1-C_4-alkyl, halo-C_1-C_4-alkyl, C_3-C_6-cycloalkyl; phenyl that is either unsubstituted or substituted once or many times, whereby the substituents may be independent of one another and are selected from the group consisting of halogen, nitro, cyano, C_1-C_4-alkyl, halo-C_1-C_4-alkyl, C_1-C_4-alkoxy, halo-C_1-C_4-alkoxy; C_1-C_4-alkylthio and halo-C_1-C_4-alkylthio; or R_4 and R_5 together are C_2-C_6-alkylene;

R_6 is hydrogen, C_1-C_4-alkyl, C_1-C_4-alkylcarbonyl, C_1-C_6-alkoxy-C_1-C_6-alkyl or benzyl;

R_7 signifies phenyl which is unsubstituted or substituted once or many times, whereby the substituents may be independent of one another and are selected from the group consisting of halogen, nitro, cyano, C_1-C_4-alkyl, halo-C_1-C_4-alkyl, C_1-C_4-alkoxy, halo-C_1-C_4-alkoxy, C_2-C_4-alkenyl, halo-C_2-C_4-alkenyl, C_2-C_4-alkinyl, C_3-C_6-cycloalkyl, C_2-C_4-alkenyloxy, halo-C_2-C_4-alkenyloxy, C_1-C_4-alkylthio, halo-C_1-C_4-alkylthio, C_1-C_4-alkylsulfonyloxy, halo-C_1-C_4-alkylsulfonyloxy, C_1-C_4-alkylsulfonyl, halo-C_1-C_4-alkylsulfonyl, C_2-C_4-alkenylsulfonyl, halo-C_2-C_4-alkenylsulfonyl, C_1-C_4-alkylamino, di(C_1-C_4-alkyl)amino, C_1-C_4-alkylcarbonyl, halo-C_1-C_4-alkylcarbonyl, C_1-C_6-alkoxycarbonyl; aryl-C_1-C_4-alkyl which is unsubstituted or substituted once or many times, aryloxy which is unsubstituted or substituted once or many times, aryloxy-C_1-C_4-alkyl which is unsubstituted or substituted once or many times, hetaryloxy-C_1-C_4-alkyl which is unsubstituted or substituted once or many times, aryloxycarbonyl which is unsubstituted or substituted once or many times, arylsulfonyl which is unsubstituted or substituted once or many times, and pyridyloxy which is unsubstituted or substituted once or many times, whereby the substituents may each be independent of one another and are selected from the group consisting of halogen, nitro, cyano, C_1-C_4-alkyl, halo-C_1-C_4-alkyl, C_1-

C_4-alkoxy, halo-C_1-C_4-alkoxy, C_1-C_4-alkylthio, halo-C_1-C_4-alkylthio, C_1-C_4-alkylsulfonyl and halo-C_1-C_4-alkylsulfonyl;
hetaryl which is unsubstituted or substituted once or many times, whereby the substituents may be independent of one another and are selected from the group consisting of halogen, nitro, cyano, C_1-C_4-alkyl, halo-C_1-C_4-alkyl, C_1-C_4-alkoxy, halo-C_1-C_4-alkoxy, C_2-C_4-alkenyloxy, halo-C_2-C_4-alkenyloxy, C_1-C_4-alkylthio, halo-C_1-C_4-alkylthio, C_1-C_4-alkylsulfonyl and halo-C_1-C_4-alkylsulfonyl; or
naphthyl or quinolyl which are unsubstituted or substituted once or many times, whereby the substituents may be independent of one another and are selected from the group consisting of halogen, nitro, cyano, C_1-C_4-alkyl, halo-C_1-C_4-alkyl, C_1-C_4-alkoxy, halo-C_1-C_4-alkoxy, C_2-C_4-alkenyloxy, halo-C_2-C_4-alkenyloxy, C_1-C_4-alkylthio, halo-C_1-C_4-alkylthio, C_2-C_4-alkenylthio, halo-C_2-C_4-alkenylthio, C_1-C_4-alkylsulfonyl and halo-C_1-C_4-alkylsulfonyl;

R_8 und R_9 independently of one another, signify hydrogen, C_1-C_6-alkyl, C_1-C_6-alkoxycarbonyl, C_1-C_6-alkylcarbonyl or aryl;

Y is C(O) or $S(O)_n$;

a signifies 1 or 2;

m is 1, 2 or 3 and

n signifies 2;

(11) A compound of formula I, wherein

R_1 signifies halogen, cyano, nitro, C_1-C_2-alkyl, halo-C_1-C_2-alkyl, C_1-C_2-alkoxy, halo-C_1-C_2-alkoxy or unsubstituted or substituted phenoxy, whereby the substituents may be independent of one another and are selected from the group consisting of halogen, C_1-C_4-alkyl, halo-C_1-C_4-alkyl, C_1-C_4-alkoxy and halo-C_1-C_4-alkoxy;

R_3, R_4 and R_5, independently of one another, signify hydrogen, halogen, C_1-C_2-alkyl, halo-C_1-C_2-alkyl or C_3-C_6-cycloalkyl;

R_6 signifies hydrogen, C_1-C_2-alkyl, C_1-C_2-alkylcarbonyl or benzyl;

R_7 signifies phenyl which is unsubstituted or substituted once or many times, whereby the substituents may be independent of one another and are selected from the group consisting of halogen, nitro, cyano, C_1-C_2-alkyl, halo-C_1-C_2-alkyl, C_1-C_2-alkoxy, halo-C_1-C_2-alkoxy, C_3-C_5-cycloalkyl, C_1-C_2-alkylthio, halo-C_1-C_2-alkylthio, C_1-C_2-alkylsulfonyl, halo-C_1-C_2-alkylsulfonyl, C_1-C_2-alkylcarbonyl, halo-C_1-C_2-alkylcarbonyl, C_1-C_2-alkoxycarbonyl; aryl-C_1-C_2-

alkyl which is unsubstituted or substituted once or many times, aryloxy which is unsubstituted or substituted once or many times, aryloxy-C_1-C_2-alkyl which is unsubstituted or substituted once or many times, and pyridyloxy which is unsubstituted or substituted once or many times, whereby the substituents may be independent of one another and are selected from the group consisting of halogen, nitro, cyano, C_1-C_2-alkyl, halo-C_1-C_2-alkyl, C_1-C_2-alkoxy, halo-C_1-C_2-alkoxy, C_1-C_2-alkylthio, halo-C_1-C_2-alkylthio, C_1-C_2-alkylsulfonyl and halo-C_1-C_2-alkylsulfonyl; or

hetaryl which is unsubstituted or substituted once or many times, whereby the substituents may be independent of one another and are selected from the group consisting of halogen, nitro, cyano, C_1-C_2-alkyl, halo-C_1-C_2-alkyl, C_1-C_2-alkoxy, halo-C_1-C_2-alkoxy, C_2-C_4-alkenyloxy, halo-C_2-C_4-alkenyloxy, C_1-C_2-alkylthio, halo-C_1-C_2-alkylthio, C_1-C_2-alkylsulfonyl and halo-C_1-C_2-alkylsulfonyl;

R_8 and R_9, independently of one another, signify hydrogen or C_1-C_4-alkyl;

Y signifies C(O);

a signifies 1; and

m is 1 or 2;

(12) A compound of formula I, wherein

R_1 signifies halogen, cyano, nitro, C_1-C_2-alkyl, halo-C_1-C_2-alkyl, C_1-C_2-alkoxy or halo-C_1-C_2-alkoxy;

R_3, R_4 and R_5, independently of one another, signify hydrogen, methyl or halomethyl;

R_6 signifies hydrogen or C_1-C_2-alkyl;

R_7 signifies phenyl which is unsubstituted or substituted once or many times, whereby the substituents may be independent of one another and are selected from the group consisting of halogen, cyano, C_1-C_2-alkyl, halo-C_1-C_2-alkyl, C_1-C_2-alkoxy, halo-C_1-C_2-alkoxy, C_3-C_5-cycloalkyl, C_1-C_2-alkylcarbonyl, halo-C_1-C_2-alkylcarbonyl, C_1-C_2-alkoxycarbonyl; aryl-C_1-C_2-alkyl which is unsubstituted or substituted once or many times, and aryloxy-C_1-C_2-alkyl which is unsubstituted or substituted once or many times, whereby the substituents may each be independent of one another and are selected from the group consisting of halogen, cyano, C_1-C_2-alkyl, halo-C_1-C_2-alkyl, C_1-C_2-alkoxy and halo-C_1-C_2-alkoxy;

R_8 and R_9, independently of one another, signify hydrogen or C_1-C_2-alkyl;

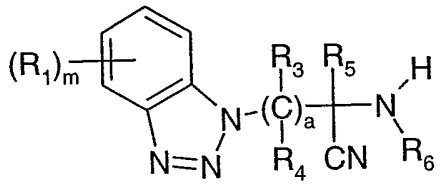
Y signifies C(O);

a signifies 1; and

m is 1 or 2.

Within the context of the invention, particular preference is given to the compounds of formula I listed in Table 1, and most particularly those named in the synthesis examples.

A further object of the invention is the process for the preparation of the compounds of formula I, respectively in free form or in salt form, for example characterised in that a compound of formula



II,

which is known or may be produced analogously to corresponding known compounds, and wherein R_1, R_3, R_4, R_5, R_6, a and m are defined as given for formula I, is reacted with a compound of formula

$$Q—Y—R_7 \quad III,$$

which is known or may be prepared analogously to corresponding known compounds, and wherein Y and R_7 are defined as given for formula I and Q is a leaving group, optionally in the presence of a basic catalyst, and if desired, a compound of formula I obtainable according to the method or in another way, respectively in free form or in salt form, is converted into another compound of formula I, a mixture of isomers obtainable according to the method is separated and the desired isomer isolated and/or a free compound of formula I obtainable according to the method is converted into a salt or a salt of a compound of formula I obtainable according to the method is converted into the free compound of formula I or into another salt.

What has been stated above for salts of compounds I also applies analogously to salts of the starting materials listed hereinabove and hereinbelow.

The reaction partners can be reacted with one another as they are, i.e. without the addition of a solvent or diluent, e.g. in the melt. In most cases, however, the addition of an inert solvent or diluent, or a mixture thereof, is of advantage. Examples of such solvents or diluents are: aromatic, aliphatic and alicyclic hydrocarbons and halogenated hydrocarbons, such as benzene, toluene, xylene, mesitylene, tetraline, chlorobenzene, dichlorobenzene, bromobenzene, petroleum ether, hexane, cyclohexane, dichloromethane, trichloromethane,

tetrachloromethane, dichloroethane, trichloroethene or tetrachloroethene; ethers, such as diethyl ether, dipropyl ether, diisopropyl ether, dibutyl ether, tert-butyl methyl ether, ethylene glycol monomethyl ether, ethylene glycol monoethyl ether, ethylene glycol dimethylether, dimethoxydiethylether, tetrahydrofuran or dioxane; ketones such as acetone, methyl ethyl ketone or methyl isobutyl ketone; amides such as N,N-dimethylformamide, N,N-diethyl-formamide, N,N-dimethylacetamide, N-methylpyrrolidone or hexamethylphosphoric acid triamide; nitriles such as acetonitrile or propionitrile; and sulfoxides, such as dimethyl sulfoxide.

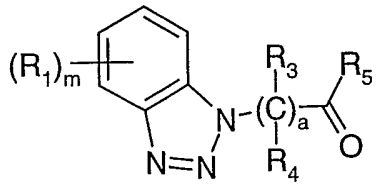
Preferred leaving groups are halogens, especially chlorine.

Suitable bases for facilitating the reaction are e.g. alkali metal or alkaline earth metal hydroxides, hydrides, amides, alkanolates, acetates, carbonates, dialkylamides or alkylsilyl-amides; alkylamines, alkylenediamines, optionally N-alkylated, optionally unsaturated, cyclo-alkylamines, basic heterocycles, ammonium hydroxides, as well as carbocyclic amines. Those which may be mentioned by way of example are sodium hydroxide, hydride, amide, methanolate, acetate, carbonate, potassium tert.-butanolate, hydroxide, carbonate, hydride, lithium diisopropylamide, potassium bis(trimethylsilyl)-amide, calcium hydride, triethylamine, diisopropylethylamine, triethylenediamine, cyclohexylamine, N-cyclohexyl-N,N-dimethyl-amine, N,N-diethylaniline, pyridine, 4-(N,N-dimethylamino)pyridine, quinuclidine, N-methyl-morpholine, benzyltrimethylammonium hydroxide, as well as 1,5-diazabicyclo[5.4.0]undec-5-ene (DBU). Preference is given to diisopropylethylamine and 4-(N,N-dimethylamino)pyridine.

The reaction advantageously takes place in a temperature range of ca. 0°C to ca. 100°C , preferably from ca. 10°C to ca. 40°C .

In a preferred process, a compound of formula II is reacted at room temperature in a halogenated hydrocarbon, preferably dichloromethane, with a compound of formula III in the presence of a base, preferably a mixture of diisopropylethylamine and 4-(N,N-dimethylamino)pyridine.

A further object of the invention is the process for the preparation of the compounds of formula II, respectively in free form or in salt form, for example characterised in that a compound of formula



IV,

which is known or may be produced analogously to corresponding known compounds, in which R_1, R_3, R_4, R_5, a and m are defined as for formula I, is reacted with an inorganic or organic cyanide and a compound of formula R_6-NH_2, which is known or may be produced analogously to corresponding known compounds and wherein R_6 is defined as for formula I, and if desired, a compound of formula II obtainable according to the method or in another way, respectively in free form or in salt form, is converted into another compound of formula II, a mixture of isomers obtainable according to the method is separated and the desired isomer isolated and/or a free compound of formula II obtainable according to the method is converted into a salt or a salt of a compound of formula II obtainable according to the method is converted into the free compound of formula II or into another salt.

Suitable cyanides are sodium cyanide, potassium cyanide, trimethylsilyl cyanide and acetone cyanohydrin.

The general method for reacting carbonyl compounds, e.g. of formula IV, with cyanides and amines, e.g. of formula R_6-NH_2, is a Strecker reaction, for example as in Organic Synthesis Coll. Vol. 3, 88 (1973).

Salts of compounds I may be produced in known manner. Acid addition salts of compounds I, for example, are obtainable by treatment with a suitable acid or a suitable ion exchange reagent, and salts with bases are obtainable by treatment with a suitable base or a suitable ion exchange reagent.

Salts of compounds I can be converted into the free compounds I by the usual means, acid addition salts e.g. by treating with a suitable basic composition or with a suitable ion exchange reagent, and salts with bases e.g. by treating with a suitable acid or a suitable ion exchange reagent.

Salts of compounds I can be converted into other salts of compounds I in a known manner; acid addition salts can be converted for example into other acid addition salts, e.g. by treating a salt of an inorganic acid, such as a hydrochloride, with a suitable metal salt, such as a sodium, barium, or silver salt, of an acid, e.g. with silver acetate, in a suitable solvent, in which a resulting inorganic salt, e.g. silver chloride, is insoluble and thus precipitates out

from the reaction mixture.

Depending on the method and/or reaction conditions, compounds I with salt-forming characteristics can be obtained in free form or in the form of salts.

Salts of compounds I may be produced in known manner. Acid addition salts of compounds I, for example, are obtainable by treatment with a suitable acid or a suitable ion exchange reagent, and salts with bases are obtainable by treatment with a suitable base or a suitable ion exchange reagent.

Salts of compounds I can be converted into the free compounds I by the usual means, acid addition salts e.g. by treating with a suitable basic composition or with a suitable ion exchange reagent, and salts with bases e.g. by treating with a suitable acid or a suitable ion exchange reagent.

Salts of compounds I can be converted into other salts of compounds I in a known manner; acid addition salts can be converted for example into other acid addition salts, e.g. by treating a salt of an inorganic acid, such as a hydrochloride, with a suitable metal salt, such as a sodium, barium, or silver salt, of an acid, e.g. with silver acetate, in a suitable solvent, in which a resulting inorganic salt, e.g. silver chloride, is insoluble and thus precipitates out from the reaction mixture.

Compounds I can also be obtained in the form of their hydrates and/or also can include other solvents, used for example where necessary for the crystallisation of compounds present in solid form.

Compounds I and II may be optionally present as optical and/or geometric isomers or as a mixture thereof. The invention relates both to the pure isomers and to all possible isomeric mixtures, and is hereinbefore and hereinafter understood as doing so, even if stereochemical details are not specifically mentioned in every case.

Diastereoisomeric mixtures of compounds I, which are obtainable by the process or in another way, may be separated in known manner, on the basis of the physical-chemical differences in their components, into the pure diastereoisomers, for example by fractional crystallisation, distillation and/or chromatography.

Splitting of mixtures of enantiomers, that are obtainable accordingly, into the pure isomers, may be achieved by known methods, for example by recrystallisation from an optically active solvent, by chromatography on chiral adsorbents, e.g. high-pressure liquid chromatography (HPLC) on acetyl cellulose, with the assistance of appropriate micro-organisms, by cleavage

with specific immobilised enzymes, through the formation of inclusion compounds, e.g. using chiral crown ethers, whereby only one enantiomer is complexed.

According to the invention, apart from separation of corresponding isomer mixtures, generally known methods of diastereoselective or enantioselective synthesis can also be applied to obtain pure diastereoisomers or enantiomers, e.g. by carrying out the method of the invention using educts with correspondingly suitable stereochemistry.

It is advantageous to isolate or synthesise the biologically more active isomer, e.g. enantiomer, or isomer mixture, e.g. enantiomer mixture, provided that the individual components have differing biological efficacy.

In the method of the present invention, the starting materials and intermediates used are preferably those that lead to the compounds I described at the beginning as being especially useful.

The invention relates especially to the method of preparation described in the example.

Starting materials and intermediates, which are new and are used according to the invention for the preparation of compounds I, as well as their usage and process for the preparation thereof, similarly form an object of the invention.

The compounds I according to the invention are notable for their particularly broad activity spectrum and are valuable active ingredients for use in pest control, including in particular the control of endo- and ecto-parasites on animals, whilst being well-tolerated by warm-blooded animals, fish and plants,

In the context of the present invention, ectoparasites are understood to be in particular insects, mites and ticks. These include insects of the order: *Lepidoptera, Coleoptera, Homoptera, Heteroptera, Diptera, Thysanoptera, Orthoptera, Anoplura, Siphonaptera, Mallophaga, Thysanura, Isoptera, Psocoptera* and *Hymenoptera.* However, the ectoparasites which may be mentioned in particular are those which trouble humans or animals and carry pathogens, for example flies such as *Musca domestica, Musca vetustissima, Musca autumnalis, Fannia canicularis, Sarcophaga carnaria, Lucilia cuprina, Hypoderma bovis, Hypoderma lineatum, Chrysomyia chloropyga, Dermatobia hominis, Cochliomyia hominivorax, Gasterophilus intestinalis, Oestrus ovis, Stomoxys calcitrans, Haematobia irritans* and midges *(Nematocera)*, such as *Culicidae, Simuliidae, Psychodidae*, but also blood-sucking parasites, for example fleas, such as *Ctenocephalides felis* and *Ctenocephalides canis* (cat and dog fleas), *Xenopsylla cheopis, Pulex irritans,*

Dermatophilus penetrans, lice, such as *Damalina ovis, Pediculus humanis*, biting flies and horse-flies *(Tabanidae), Haematopota spp.* such as *Haematopota pluvialis, Tabanidea spp.* such as *Tabanus nigrovittatus, Chrysopsinae* spp. such as *Chrysops caecutiens*, tsetse flies, such as species of *Glossinia*, biting insects, particularly cockroaches, such as *Blatella germanica, Blatta orientalis, Periplaneta americana,* mites, such as *Dermanyssus gallinae, Sarcoptes scabiei, Psoroptes ovis* and *Psorergates spp.* and last but not least ticks. The latter belong to the order *Acarina.* Known representatives of ticks are, for example, *Boophilus, Amblyomma, Anocentor, Dermacentor, Haemaphysalis, Hyalomma, Ixodes, Rhipicentor, Margaropus, Rhipicephalus, Argas, Otobius* and *Ornithodoros* and the like, which preferably infest warm-blooded animals including farm animals, such as cattle, pigs, sheep and goats, poultry such as chickens, turkeys and geese, fur-bearing animals such as mink, foxes, chinchillas, rabbits and the like, as well as domestic animals such as cats and dogs, but also humans.

Compounds I can also be used against hygiene pests, especially of the order *Diptera* of the families *Sarcophagidae, Anophilidae* and *Culicidae*; the orders *Orthoptera, Dictyoptera* (e.g. the family *Blattidae*) and *Hymenoptera* (e.g. the family *Formicidae*).

Compounds I also have sustainable efficacy on parasitic mites and insects of plants. In the case of spider mites of the order *Acarina*, they are effective against eggs, nymphs and adults of *Tetranychidae* (*Tetranychus spp.* and *Panonychus spp.*).

They have high activity against sucking insects of the order *Homoptera*, especially against pests of the families *Aphididae, Delphacidae, Cicadellidae, Psyllidae, Loccidae, Diaspididae* and *Eriophydidae* (e.g. rust mite on citrus fruits); the orders *Hemiptera, Heteroptera* and *Thysanoptera*, and on the plant-eating insects of the orders *Lepidoptera, Coleoptera, Diptera* and *Orthoptera*

They are similarly suitable as a soil insecticide against pests in the soil.

The compounds of formula I are therefore effective against all stages of development of sucking insects and eating insects on crops such as cereals, cotton, rice, maize, soya, potatoes, vegetables, fruit, tobacco, hops, citrus, avocados and other crops.

The compounds of formula I are also effective against plant nematodes of the species *Meloidogyne, Heterodera, Pratylenchus, Ditylenchus, Radopholus, Rizoglyphus* etc.

In particular, the compounds are effective against helminths, in which the endoparasitic nematodes and trematodes may be the cause of serious diseases of mammals and poultry,

e.g. sheep, pigs, goats, cattle, horses, donkeys, dogs, cats, guinea-pigs and exotic birds. Typical nematodes of this indication are: *Haemonchus, Trichostrongylus, Ostertagia, Nematodirus, Cooperia, Ascaris, Bunostonum, Oesophagostonum, Charbertia, Trichuris, Strongylus, Trichonema, Dictyocaulus, Capillaria, Heterakis, Toxocara, Ascaridia, Oxyuris, Ancylostoma, Uncinaria, Toxascaris* and *Parascaris.* The trematodes include, in particular, the family of *Fasciolideae*, especially *Fasciola hepatica.* The particular advantage of the compounds of formula I is their efficacy against those parasites that are resistant towards active ingredients based on benzimidazole.

Certain pests of the species *Nematodirus, Cooperia* and *Oesophagostonum* infest the intestinal tract of the host animal, while others of the species *Haemonchus* and *Ostertagia* are parasitic in the stomach and those of the species *Dictyocaulus* are parasitic in the lung tissue. Parasites of the families *Filariidae* and *Setariidae* may be found in the internal cell tissue and in the organs, e.g. the heart, the blood vessels, the lymph vessels and the subcutaneous tissue. A particularly notable parasite is the heartworm of the dog, *Dirofilaria immitis.* The compounds of formula I are highly effective against these parasites.

Furthermore, the compounds of formula I are suitable for the control of human pathogenic parasites. Of these, typical representatives that appear in the digestive tract are those of the species *Ancylostoma, Necator, Ascaris, Strongyloides, Trichinella, Capillaria, Trichuris* and *Enterobius.* The compounds of the present invention are also effective against parasites of the species *Wuchereria, Brugia, Onchocerca* and *Loa* from the family of *Filariidae*, which appear in the blood, in the tissue and in various organs, and also against *Dracunculus* and parasites of the species *Strongyloides* and *Trichinella*, which infect the gastrointestinal tract in particular.

Finally, the compounds of formula I also have fungicidal and bactericidal activity.

The good pesticidal activity of the compounds of formula I according to the invention corresponds to a mortality rate of at least 50-60% of the pests mentioned. In particular, the compounds of formula I are notable for the exceptionally long duration of efficacy.

The compounds of formula I are preferably employed in unmodified form or preferably together with the adjuvants conventionally used in the art of formulation and may therefore be processed in a known manner to give, for example, emulsifiable concentrates, directly dilutable solutions, dilute emulsions, soluble powders, granules or microencapsulations in polymeric substances. As with the compositions, the methods of application are selected in accordance with the intended objectives and the prevailing circumstances.

The formulation, i.e. the agents, preparations or compositions containing the active ingredient of formula I, or combinations of these active ingredients with other active ingredients, and optionally a solid or liquid adjuvant, are produced in a manner known *per se*, for example by intimately mixing and/or grinding the active ingredients with spreading compositions, for example with solvents, solid carriers, and optionally surface-active compounds (surfactants).

The solvents in question may be: alcohols, such as ethanol, propanol or butanol, and glycols and their ethers and esters, such as propylene glycol, dipropylene glycol ether, ethylene glycol, ethylene glycol monomethyl or -ethyl ether, ketones, such as cyclohexanone, isophorone or diacetanol alcohol, strong polar solvents, such as N-methyl-2-pyrrolidone, dimethyl sulfoxide or dimethylformamide, or water, vegetable oils, such as rape, castor, coconut, or soybean oil, and also, if appropriate, silicone oils.

Preferred application forms for usage on warm-blooded animals in the control of helminths include solutions, emulsions, suspensions (drenches), food additives, powders, tablets including effervescent tablets, boli, capsules, micro-capsules and pour-on formulations, whereby the physiological compatibility of the formulation excipients must be taken into consideration.

The binders for tablets and boli may be chemically modified polymeric natural substances that are soluble in water or in alcohol, such as starch, cellulose or protein derivatives (e.g. methyl cellulose, carboxymethyl cellulose, ethylhydroxyethyl cellulose, proteins such as zein, gelatin and the like), as well as synthetic polymers, such as polyvinyl alcohol, polyvinyl pyrrolidone etc. The tablets also contain fillers (e.g. starch, microcrystalline cellulose, sugar, lactose etc.), glidants and disintegrants.

If the anthelminthics are present in the form of feed concentrates, then the carriers used are e.g. performance feeds, feed grain or protein concentrates. Such feed concentrates or compositions may contain, apart from the active ingredients, also additives, vitamins, antibiotics, chemotherapeutics or other pesticides, primarily bacteriostats, fungistats, coccidiostats, or even hormone preparations, substances having anabolic action or substances which promote growth, which affect the quality of meat of animals for slaughter or which are beneficial to the organism in another way. If the compositions or the active ingredients of formula I contained therein are added directly to feed or to the drinking troughs, then the formulated feed or drink contains the active ingredients preferably in a concentration of ca. 0.0005 to 0.02 % by weight (5-200 ppm).

The compounds of formula I according to the invention may be used alone or in combination with other biocides. They may be combined with pesticides having the same sphere of activity e.g. to increase activity, or with substances having another sphere of activity e.g. to broaden the range of activity. It can also be sensible to add so-called repellents. If the range of activity is to be extended to endoparasites, e.g. wormers, the compounds of formula I are suitably combined with substances having endoparasitic properties. Of course, they can also be used in combination with antibacterial compositions. Since the compounds of formula I are adulticides, i.e. since they are effective in particular against the adult stages of the target parasites, the addition of pesticides which instead attack the juvenile stages of the parasites may be very advantageous. In this way, the greatest part of those parasites that produce great economic damage will be covered. Moreover, this action will contribute substantially to avoiding the formation of resistance. Many combinations may also lead to synergistic effects, i.e. the total amount of active ingredient can be reduced, which is desirable from an ecological point of view. Preferred groups of combination partners and especially preferred combination partners are named in the following, whereby combinations may contain one or more of these partners in addition to a compound of formula I.

Suitable partners in the mixture may be biocides, e.g. the insecticides and acaricides with a varying mechanism of activity, which are named in the following and have been known to the person skilled in the art for a long time, e.g. chitin synthesis inhibitors, growth regulators; active ingredients which act as juvenile hormones; active ingredients which act as adulticides; broad-band insecticides, broad-band acaricides and nematicides; and also the well known anthelminthics and insect- and/or acarid-deterring substances, said repellents or detachers.

Non-limitative examples of suitable insecticides and acaricides are:

1. Abamectin	10. Avermectin B_1	19. Bensultap
2. AC 303 630	11. AZ 60541	20. β-Cyfluthrin
3. Acephat	12. Azinphos A	21. Bifenthrin
4. Acrinathrin	13. Azinphos M	22. BPMC
5. Alanycarb	14. Azinphos-methyl	23. Brofenprox
6. Aldicarb	15. Azocyclotin	24. Bromophos A
7. α-Cypermethrin	16. *Bacillus subtil.* toxin	25. Bufencarb
8. Alphamethrin	17. Bendiocarb	26. Buprofezin
9. Amitraz	18. Benfuracarb	27. Butocarboxin

28. Butylpyridaben
29. Cadusafos
30. Carbaryl
31. Carbofuran
32. Carbophenthion
33. Cartap
34. Chloethocarb
35. Chlorethoxyfos
36. Chlorfenapyr
37. Chlorfluazuron
38. Chlormephos
39. Chlorpyrifos
40. Cis-Resmethrin
41. Clocythrin
42. Clofentezin
43. Cyanophos
44. Cycloprothrin
45. Cyfluthrin
46. Cyhexatin
47. D 2341
48. Deltamethrin
49. Demeton M
50. Demeton S
51. Demeton-S-methyl
52. Dibutylaminothio
53. Dichlofenthion
54. Dicliphos
55. Diethion
56. Diflubenzuron
57. Dimethoat
58. Dimethylvinphos
59. Dioxathion
60. DPX-MP062

61. Edifenphos
62. Emamectin
63. Endosulfan
64. Esfenvalerat
65. Ethiofencarb
66. Ethion
67. Ethofenprox
68. Ethoprophos
69. Etrimphos
70. Fenamiphos
71. Fenazaquin
72. Fenbutatinoxid
73. Fenitrothion
74. Fenobucarb
75. Fenothiocarb
76. Fenoxycarb
77. Fenpropathrin
78. Fenpyrad
79. Fenpyroximate
80. Fenthion
81. Fenvalerate
82. Fipronil
83. Fluazinam
84. Fluazuron
85. Flucycloxuron
86. Flucythrinat
87. Flufenoxuron
88. Flufenprox
89. Fonophos
90. Formothion
91. Fosthiazat
92. Fubfenprox
93. HCH

94. Heptenophos
95. Hexaflumuron
96. Hexythiazox
97. Hydroprene
98. Imidacloprid
99. insect-active fungi
100. insect-active nematodes
101. insect-active viruses
102. Iprobenfos
103. Isofenphos
104. Isoprocarb
105. Isoxathion
106. Ivermectin
107. λ-Cyhalothrin
108. Lufenuron
109. Malathion
110. Mecarbam
111. Mesulfenphos
112. Metaldehyd
113. Methamidophos
114. Methiocarb
115. Methomyl
116. Methoprene
117. Metolcarb
118. Mevinphos
119. Milbemectin
120. Moxidectin
121. Naled
122. NC 184
123. NI-25, Acetamiprid
124. Nitenpyram
125. Omethoat

126. Oxamyl
127. Oxydemethon M
128. Oxydeprofos
129. Parathion
130. Parathion-methyl
131. Permethrin
132. Phenthoat
133. Phorat
134. Phosalone
135. Phosmet
136. Phoxim
137. Pirimicarb
138. Pirimiphos A
139. Pirimiphos M
140. Promecarb
141. Propaphos
142. Propoxur
143. Prothiofos
144. Prothoat
145. Pyrachlophos
146. Pyradaphenthion
147. Pyresmethrin

148. Pyrethrum
149. Pyridaben
150. Pyrimidifen
151. Pyriproxyfen
152. RH 5992
153. RH-2485
154. Salithion
155. Sebufos
156. Silafluofen
157. Spinosad
158. Sulfotep
159. Sulprofos
160. Tebufenozide
161. Tebufenpyrad
162. Tebupirimphos
163. Teflubenzuron
164. Tefluthrin
165. Temephos
166. Terbam
167. Terbufos
168. Tetrachlorvinphos
169. Thiafenox

170. Thiodicarb
171. Thiofanox
172. Thionazin
173. Thuringiensin
174. Tralomethrin
175. Triarthen
176. Triazamate
177. Triazophos
178. Triazuron
179. Trichlorfon
180. Triflumuron
181. Trimethacarb
182. Vamidothion
183. XMC (3,5,-xylyl-methylcarbamate)
184. Xylylcarb
185. YI 5301/5302
186. ζ-Cypermethrin
187. Zetamethrin

Non-limitative examples of suitable anthelminthics are named in the following, a few representatives have insecticidal and acaricidal activity in addition to the anthelminthic activity, and are partly already in the above list.

(A1) Praziquantel = 2-cyclohexylcarbonyl-4-oxo-1,2,3,6,7,11b-hexahydro-4H-pyrazino[2,1-α]isoquinoline

(A2) Closantel = 3,5-diiodo-N-[5-chloro-2-methyl-4-(a-cyano-4-chlorobenzyl)phenyl]-salicylamide

(A3) Triclabendazole = 5-chloro-6-(2,3-dichlorophenoxy)-2-methylthio-1H-benzimidazole

(A4) Levamisol = *L*-(-)-2,3,5,6-tetrahydro-6-phenylimidazo[2,1b]thiazole

(A5) Mebendazole = (5-benzoyl-1H-benzimidazol-2-yl)carbaminic acid methylester

(A6) Omphalotin = a macrocyclic fermentation product of the fungus *Omphalotus olearius* described in WO 97/20857

(A7) Abamectin = avermectin B1

(A8) Ivermectin = 22,23-dihydroavermectin B1

(A9) Moxidectin = 5-O-demethyl-28-deoxy-25-(1,3-dimethyl-1-butenyl)-6,28- epoxy-23-(methoxyimino)-milbemycin B

(A10) Doramectin = 25-cyclohexyl-5-O-demethyl-25-de(1-methylpropyl)-avermectin A1a

(A11) Milbemectin = mixture of milbemycin A3 and milbemycin A4

(A12) Milbemycinoxim = 5-oxime of milbemectin

Non-limitative examples of suitable repellents and detachers are:

(R1) DEET (N, N-diethyl-m-toluamide)

(R2) KBR 3023 N-butyl-2-oxycarbonyl-(2-hydroxy)-piperidine

(R3) Cymiazole = N,-2,3-dihydro-3-methyl-1,3-thiazol-2-ylidene-2,4-xylidene

The said partners in the mixture are best known to specialists in this field. Most are described in various editions of the Pesticide Manual, The British Crop Protection Council, London, and others in the various editions of The Merck Index, Merck & Co., Inc., Rahway, New Jersey, USA or in patent literature. Therefore, the following listing is restricted to a few places where they may be found by way of example.

(I) 2-Methyl-2-(methylthio)propionaldehyde-*O*-methylcarbamoyloxime (Aldicarb), from The Pesticide Manual, 11th Ed. (1997), The British Crop Protection Council, London, page 26;

(II) *S*-(3,4-dihydro-4-oxobenzo[*d*]-[1,2,3]-triazin-3-ylmethyl)O,O-dimethyl-phosphoro-dithioate (Azinphos-methyl), from The Pesticide Manual, 11thEd. (1997), The British Crop Protection Council, London, page 67;

(III) Ethyl-N-[2,3-dihydro-2,2-dimethylbenzofuran-7-yloxycarbonyl-(methyl)aminothio]-N-isopropyl-β-alaninate (Benfuracarb), from The Pesticide Manual, 11thEd. (1997), The British Crop Protection Council, London, page 96;

(IV) 2-Methylbiphenyl-3-ylmethyl-(*Z*)-(1*RS*)-*cis*-3-(2-chloro-3,3,3-trifluoroprop-1-enyl)-2,2-dimethylcyclopropanecarboxylate (Bifenthrin), from The Pesticide Manual, 11thEd. (1997), The British Crop Protection Council, London, page 118;

(V) 2-tert-butylimino-3-isopropyl-5-phenyl-1,3,5-thiadiazian-4-one (Buprofezin), from The Pesticide Manual, 11thEd. (1997), The British Crop Protection Council, London, page 157;

(VI) 2,3-Dihydro-2,2-dimethylbenzofuran-7-yl-methylcarbamate (Carbofuran), from The Pesticide Manual, 11thEd. (1997), The British Crop Protection Council, London, page 186;

(VII) 2,3-Dihydro-2,2-dimethylbenzofuran-7-yl-(dibutylaminothio)methylcarbamate (Carbosulfan), from The Pesticide Manual, 11th Ed. (1997), The British Crop Protection Council, London, page 188;

(VIII) *S,S'*-(2-dimethylaminotrimethylene)-bis(thiocarbamate) (Cartap), from The Pesticide Manual, 11th Ed. (1997), The British Crop Protection Council, London, page 193;

(IX) 1-[3,5-Dichloro-4-(3-chloro-5-trifluoromethyl-2-pyridyloxy)phenyl]-3-(2,6-difluoro-benzoyl)-urea (Chlorfluazuron), from The Pesticide Manual, 11th Ed. (1997), The British Crop Protection Council, London, page 213;

(X) *O,O*-diethyl-*O*-3,5,6-trichloro-2-pyridyl-phosphorothioate (Chlorpyrifos), from The Pesticide Manual, 11th Ed. (1997), The British Crop Protection Council, London, page 235;

(XI) (*RS*)-α-cyano-4-fluoro-3-phenoxybenzyl-(1*RS*,3*RS*;1*RS*,3*RS*)-3-(2,2-dichlorovinyl)-2,2-di-methylcyclopropanecarboxylate (Cyfluthrin), from The Pesticide Manual, 11th Ed. (1997), The British Crop Protection Council, London, page 293;

(XII) Mixture of (*S*)-α-cyano-3-phenoxybenzyl-(*Z*)-(1*R*,3*R*)-3-(2-chloro-3,3,3-trifluoro-propenyl)-2,2-dimethylcyclopropanecarboxylate and (*R*)-α-cyano-3-phenoxybenzyl-(*Z*)-(1*R*,3*R*)-3-(2-chloro-3,3,3-trifluoropropenyl)-2,2-dimethylcyclopropanecarboxylate (Lambda-Cyhalothrin), from The Pesticide Manual, 11th Ed. (1997), The British Crop Protection Council, London, page 300;

(XIII) Racemate consisting of (*S*)-α-cyano-3-phenoxybenzyl-(*Z*)-(1*R*,3*R*)-3-(2,2-dichlorovinyl)-2,2-dimethylcyclopropanecarboxylate and (*R*)-α-cyano-3-phenoxybenzyl-(1*S*,3*S*)-3-(2,2-dichlorovinyl)-2,2-dimethylcyclopropanecarboxylate (Alpha-cypermethrin), from The Pesticide Manual, 11th Ed. (1997), The British Crop Protection Council, London, page 308;

(XIV) a mixture of the stereoisomers of (*S*)-α-cyano-3-phenoxybenzyl (1*RS*,3*RS*,-1*RS*,3*RS*)-3-(2,2-dichlorovinyl)-2,2-dimethylcyclopropanecarboxylate (zeta-Cypermethrin), from The Pesticide Manual, 11th Ed. (1997), The British Crop Protection Council, London, page 314;

(XV) (*S*)-α-cyano-3-phenoxybenzyl-(1*R*,3*R*)-3-(2,2-dibromovinyl)-2,2-dimethylcyclopropane-carboxylate (Deltamethrin), from The Pesticide Manual, 11th Ed. (1997), The British Crop Protection Council, London, page 344;

(XVI) (4-chlorophenyl)-3-(2,6-difluorobenzoyl)urea (Diflubenzuron), from The Pesticide Manual, 11th Ed. (1997), The British Crop Protection Council, London, page 395;

(XVII) (1,4,5,6,7,7-Hexachloro-8,9,10-trinorborn-5-en-2,3-ylenebismethylene)-sulphite (Endosulfan), from The Pesticide Manual, 11thEd. (1997), The British Crop Protection Council, London, page 459;

(XVIII) α-ethylthio-o-tolyl-methylcarbamate (Ethiofencarb), from The Pesticide Manual, 11thEd. (1997), The British Crop Protection Council, London, page 479;

(XIX) *O,O*-dimethyl-*O*-4-nitro-*m*-tolyl-phosphorothioate (Fenitrothion), from The Pesticide Manual, 11thEd. (1997), The British Crop Protection Council, London, page 514;

(XX) 2-*sec*-butylphenyl-methylcarbamate (Fenobucarb), from The Pesticide Manual, 11thEd. (1997), The British Crop Protection Council, London, page 516;

(XXI) (*RS*)-α-cyano-3-phenoxybenzyl-(*RS*)-2-(4-chlorophenyl)-3-methylbutyrate (Fenvalerate), from The Pesticide Manual, 11thEd. (1997), The British Crop Protection Council, London, page 539;

(XXII) *S*-[formyl(methyl)carbamoylmethyl]-*O,O*-dimethyl-phosphorodithioate (Formothion), from The Pesticide Manual, 11thEd. (1997), The British Crop Protection Council, London, page 625;

(XXIII) 4-Methylthio-3,5-xylyl-methylcarbamate (Methiocarb), from The Pesticide Manual, 11thEd. (1997), The British Crop Protection Council, London, page 813;

(XXIV) 7-Chlorobicyclo[3.2.0]hepta-2,6-dien-6-yl-dimethylphosphate (Heptenophos), from The Pesticide Manual, 11thEd. (1997), The British Crop Protection Council, London, page 670;

(XXV) 1-(6-chloro-3-pyridylmethyl)-*N*-nitroimidazolidin-2-ylidenamine (Imidacloprid), from The Pesticide Manual, 11thEd. (1997), The British Crop Protection Council, London, page 706;

(XXVI) 2-isopropylphenyl-methylcarbamate (Isoprocarb), from The Pesticide Manual, 11thEd. (1997), The British Crop Protection Council, London, page 729;

(XXVII) *O,S*-dimethyl-phosphoramidothioate (Methamidophos), from The Pesticide Manual, 11thEd. (1997), The British Crop Protection Council, London, page 808;

(XXVIII) *S*-Methyl-*N*-(methylcarbamoyloxy)thioacetimidate (Methomyl), from The Pesticide Manual, 11thEd. (1997), The British Crop Protection Council, London, page 815;

(XXIX) Methyl-3-(dimethoxyphosphinoyloxy)but-2-enoate (Mevinphos), from The Pesticide Manual, 11thEd. (1997), The British Crop Protection Council, London, page 844;

(XXX) *O,O*-diethyl-*O*-4-nitrophenyl-phosphorothioate (Parathion), from The Pesticide Manual, 11thEd. (1997), The British Crop Protection Council, London, page 926;

(XXXI) *O,O*-dimethyl-*O*-4-nitrophenyl-phosphorothioate (Parathion-methyl), from The Pesticide Manual, 11th Ed. (1997), The British Crop Protection Council, London, page 928;

(XXXII) *S*-6-chloro-2,3-dihydro-2-oxo-1,3-benzoxazol-3-ylmethyl-*O,O*-diethyl-phosphordithioate (Phosalone), from The Pesticide Manual, 11th Ed. (1997), The British Crop Protection Council, London, page 963;

(XXXIII) 2-Dimethylamino-5,6-dimethylpyrimidin-4-yl-dimethylcarbamate (Pirimicarb), from The Pesticide Manual, 11th Ed. (1997), The British Crop Protection Council, London, page 985;

(XXXIV) 2-isopropoxyphenyl-methylcarbamate (Propoxur), from The Pesticide Manual, 11th Ed. (1997), The British Crop Protection Council, London, page 1036;

(XXXV) 1-(3,5-dichloro-2,4-difluorophenyl)-3-(2,6-difluorobenzoyl)urea (Teflubenzuron), from The Pesticide Manual, 11th Ed. (1997), The British Crop Protection Council, London, page 1158;

(XXXVI) *S*-tert-butylthiomethyl-*O,O*-dimethyl-phosphorodithioate (Terbufos), from The Pesticide Manual, 11th Ed. (1997), The British Crop Protection Council, London, page 1165;

(XXXVII) ethyl-(3-*tert.*-butyl-1-dimethylcarbamoyl-1*H*-1,2,4-triazol-5-yl-thio)-acetate, (Triazamate), from The Pesticide Manual, 11th Ed. (1997), The British Crop Protection Council, London, page 1224;

(XXXVIII) Abamectin, from The Pesticide Manual, 11th Ed. (1997), The British Crop Protection Council, London, page 3;

(XXXIX) 2-*sec*-butylphenyl-methylcarbamate (Fenobucarb), from The Pesticide Manual, 11th Ed. (1997), The British Crop Protection Council, London, page 516;

(XL) *N-tert.*-butyl-*N'*-(4-ethylbenzoyl)-3,5-dimethylbenzohydrazide (Tebufenozide), from The Pesticide Manual, 11th Ed. (1997), The British Crop Protection Council, London, page 1147;

(XLI) (±)-5-amino-1-(2,6-dichloro-α,α,α-trifluoro-p-tolyl)-4-trifluoromethyl-sulphinylpyrazol-3-carbonitrile (Fipronil), from The Pesticide Manual, 11th Ed. (1997), The British Crop Protection Council, London, page 545;

(XLII) (*RS*)-α-cyano-4-fluoro-3-phenoxybenzyl(1*RS*,3*RS*;1*RS*,3*RS*)-3-(2,2-dichloro-vinyl)-2,2-dimethylcyclopropanecarboxylate (beta-Cyfluthrin), from The Pesticide Manual, 11th Ed. (1997), The British Crop Protection Council, London, page 295;

(XLIII) (4-ethoxyphenyl)-[3-(4-fluoro-3-phenoxyphenyl)propyl](dimethyl)silane (Silafluofen), from The Pesticide Manual, 11th Ed. (1997), The British Crop Protection Council, London, page 1105;

(XLIV) *tert.*-butyl (*E*)-α-(1,3-dimethyl-5-phenoxypyrazol-4-yl-methylenamino-oxy)-p-toluate (Fenpyroximate), from The Pesticide Manual, 11th Ed. (1997), The British Crop Protection Council, London, page 530;

(XLV) 2-*tert.*-butyl-5-(4-*tert.*-butylbenzylthio)-4-chloropyridazin-3(*2H*)-one (Pyridaben), from The Pesticide Manual, 11th Ed. (1997), The British Crop Protection Council, London, page 1161;

(XLVI) 4-[[4-(1,1-dimethylphenyl)phenyl]ethoxy]-quinazoline (Fenazaquin), from The Pesticide Manual, 11th Ed. (1997), The British Crop Protection Council, London, page 507;

(XLVII) 4-phenoxyphenyl-(*RS*)-2-(pyridyloxy)propyl-ether (Pyriproxyfen), from The Pesticide Manual, 11th Ed. (1997), The British Crop Protection Council, London, page 1073;

(XLVIII) 5-chloro-*N*-{2-[4-(2-ethoxyethyl)-2,3-dimethylphenoxy]ethyl}-6-ethylpyrimidine-4-amine (Pyrimidifen), from The Pesticide Manual, 11th Ed. (1997), The British Crop Protection Council, London, page 1070;

(XLIX) (*E*)-*N*-(6-chloro-3-pyridylmethyl)-*N*-ethyl-*N'*-methyl-2-nitrovinylidenediamine (Nitenpyram), from The Pesticide Manual, 11th Ed. (1997), The British Crop Protection Council, London, page 880;

(L) (*E*)-N^1-[(6-chloro-3-pyridyl)methyl]-N^2-cyano-N^1-methylacetamidine (NI-25, Acetamiprid), from The Pesticide Manual, 11th Ed. (1997), The British Crop Protection Council, London, page 9;

(LI) Avermectin B_1 , from The Pesticide Manual, 11th Ed. (1997), The British Crop Protection Council, London, page 3;

(LII) an insect-active extract from a plant, especially (2*R*,6a*S*,12a*S*)-1,2,6,6a,12,12a-hexhydro-2-isopropenyl-8,9-dimethoxy-chromeno[3,4-*b*]furo[2,3-*h*]chromen-6-one (Rotenone), from The Pesticide Manual, 11th Ed. (1997), The British Crop Protection Council, London, page 1097; and an extract from *Azadirachta indica*, especially azadirachtin, from The Pesticide Manual, 11th Ed. (1997), The British Crop Protection Council, London, page 59; and

(LIII) a preparation which contains insect-active nematodes, preferably *Heterorhabditis bacteriophora* and H*eterorhabditis megidis*, from The Pesticide Manual, 11th Ed. (1997), The British Crop Protection Council, London, page 671; *Steinernema feltiae*, from The

Pesticide Manual, 11thEd. (1997), The British Crop Protection Council, London, page 1115 and *Steinernema scapterisci*, from The Pesticide Manual, 11thEd. (1997), The British Crop Protection Council, London, page 1116;

(LIV) a preparation obtainable from *Bacillus subtilis*, from The Pesticide Manual, 11thEd. (1997), The British Crop Protection Council, London, page 72; or from a strain of *Bacillus thuringiensis* with the exception of compounds isolated from GC91 or from NCTC11821; The Pesticide Manual, 11thEd. (1997), The British Crop Protection Council, London, page 73;

(LV) a preparation which contains insect-active fungi, preferably *Verticillium lecanii*, from The Pesticide Manual, 11thEd. (1997), The British Crop Protection Council, London, page 1266; *Beauveria brogniartii*, from The Pesticide Manual, 11thEd. (1997), The British Crop Protection Council, London, page 85 and *Beauveria bassiana*, from The Pesticide Manual, 11thEd. (1997), The British Crop Protection Council, London, page 83;

(LVI) a preparation which contains insect-active viruses, preferably *Neodipridon Sertifer NPV*, from The Pesticide Manual, 11thEd. (1997), The British Crop Protection Council, London, page 1342; *Mamestra brassicae* NPV, from The Pesticide Manual, 11thEd. (1997), The British Crop Protection Council, London, page 759 and *Cydia pomonella granulosis* virus, from The Pesticide Manual, 11thEd. (1997), The British Crop Protection Council, London, page 291;

(CLXXXI) 7-chloro-2,3,4*a*,5-tetrahydro-2-[methoxycarbonyl(4-trifluoromethoxyphenyl)-carbamoyl]indol[1,2*e*]oxazoline-4*a*-carboxylate (DPX-MP062, Indoxycarb), from The Pesticide Manual, 11thEd. (1997), The British Crop Protection Council, London, page 453;

(CLXXXII) *N*'-tert.-butyl-*N*'-(3,5-dimethylbenzoyl)-3-methoxy-2-methylbenzohydrazide (RH-2485, Methoxyfenozide), from The Pesticide Manual, 11thEd. (1997), The British Crop Protection Council, London, page 1094; and

(CLXXXIII) (*N*'-[4-methoxy-biphenyl-3-yl]-hydrazinecarboxylic acid isopropylester (D 2341), from Brighton Crop Protection Conference, 1996, 487- 493;

(R2) Book of Abstracts, 212th ACS National Meeting Orlando, FL, August 25-29 (1996), AGRO-020. Publisher: American Chemical Society, Washington, D.C. CONEN: 63BFAF.

As a consequence of the above details, a further essential aspect of the present invention relates to combination preparations for the control of parasites on warm-blooded animals, characterised in that they contain, in addition to a compound of formula I, at least one further active ingredient having the same or different sphere of activity and at least one

physiologically acceptable carrier. The present invention is not restricted to two-fold combinations.

As a rule, the anthelminthic compositions according to the invention contain 0.1 to 99 % by weight, especially 0.1 to 95 % by weight of active ingredient of formula I, Ia or mixtures thereof, 99.9 to 1 % by weight, especially 99.8 to 5 % by weight of a solid or liquid admixture, including 0 to 25 % by weight, especially 0.1 to 25 % by weight of a surfactant.

Application of the compositions according to the invention to the animals to be treated may take place topically, perorally, parenterally or subcutaneously, the composition being present in the form of solutions, emulsions, suspensions, (drenches), powders, tablets, boli, capsules and pour-on formulations.

The pour-on or spot-on method consists in applying the compound of formula I to a specific location of the skin or coat, advantageously to the neck or backbone of the animal. This takes place e.g. by applying a swab or spray of the pour-on or spot-on formulation to a relatively small area of the coat, from where the active substance is dispersed almost automatically over wide areas of the fur owing to the spreading nature of the components in the formulation and assisted by the animal's movements.

Pour-on or spot-on formulations suitably contain carriers, which promote rapid dispersement over the skin surface or in the coat of the host animal, and are generally regarded as spreading oils. Suitable carriers are e.g. oily solutions; alcoholic and isopropanolic solutions such as solutions of 2-octyldodecanol or oleyl alcohol; solutions in esters of monocarboxylic acids, such as isopropyl myristate, isopropyl palmitate, lauric acid oxalate, oleic acid oleyl ester, oleic acid decyl ester, hexyl laurate, oleyl oleate, decyl oleate, capric acid esters of saturated fat alcohols of chain length C_{12}-C_{18}; solutions of esters of dicarboxylic acids, such as dibutyl phthalate, diisopropyl isophthalate, adipic acid diisopropyl ester, di-n-butyl adipate or also solutions of esters of aliphatic acids, e.g. glycols. It may be advantageous for a dispersing agent to be additionally present, such as one known from the pharmaceutical or cosmetic industry. Examples are 2-pyrrolidone, 2-(N-alkyl)pyrrolidone, acetone, polyethylene glycol and the ethers and esters thereof, propylene glycol or synthetic triglycerides.

The oily solutions include e.g. vegetable oils such as olive oil, groundnut oil, sesame oil, pine oil, linseed oil or castor oil. The vegetable oils may also be present in epoxidised form. Paraffins and silicone oils may also be used.

A pour-on or spot-on formulation generally contains 1 to 20 % by weight of a compound of formula I, 0.1 to 50 % by weight of dispersing agent and 45 to 98.9 % by weight of solvent.

The pour-on or spot-on method is especially advantageous for use on herd animals such as cattle, horses, sheep or pigs, in which it is difficult or time-consuming to treat all the animals orally or by injection. Because of its simplicity, this method can of course also be used for all other animals, including individual domestic animals or pets, and is greatly favoured by the keepers of the animals, as it can often be carried out without the specialist presence of the veterinarian.

Whereas it is preferred to formulate commercial products as concentrates, the end user will normally use dilute formulations.

Such compositions may also contain further additives, such as stabilisers, anti-foaming agents, viscosity regulators, binding agents or tackifiers, as well as other active ingredients, in order to achieve special effects.

Anthelminthic compositions of this type, which are used by the end user, similarly form a constituent of the present invention.

In each of the processes according to the invention for pest control or in each of the pest control compositions according to the invention, the active ingredients of formula I can be used in all of their steric configurations or in mixtures thereof.

The invention also includes a method of prophylactically protecting warm-blooded animals, especially productive livestock, domestic animals and pets, against parasitic helminths, which is characterised in that the active ingredients of the formula or the active ingredient formulations prepared therefrom are administered to the animals as an additive to the feed, or to the drinks or also in solid or liquid form, orally or by injection or parenterally. The invention also includes the compounds of formula I according to the invention for usage in one of the said processes.

The following examples serve merely to illustrate the invention without restricting it, the term active ingredient representing a substance listed in tables...

In particular, preferred formulations are made up as follows:

(% = percent by weight)

Formulation examples

1. Granulate	a)	b)

active ingredient	5 %	10 %
kaolin	94 %	-
highly dispersed silicic acid	1 %	-
attapulgite	-	90 %

The active ingredient is dissolved in methylene chloride, sprayed onto the carrier and the solvent subsequently concentrated by evaporation under vacuum. Granulates of this kind can be mixed with the animal feed.

2. Granulate

active ingredient	3 %
polyethylene glycol (mw 200)	3 %
kaolin	94 %

(mw = molecular weight)

The finely ground active ingredient is evenly applied in a mixer to the kaolin which has been moistened with polyethylene glycol. In this way, dust-free coated granules are obtained.

3. Tablets or boli

I	active ingredient	33.00 %
	methylcellulose	0.80 %
	silicic acid, highly dispersed	0.80 %
	corn starch	8.40 %
II	lactose, cryst.	22.50 %
	corn starch	17.00 %
	microcryst. cellulose	16.50 %
	magnesium stearate	1.00 %

I Methyl cellulose is stirred into water. After the material has swollen, silicic acid is stirred in and the mixture homogeneously suspended. The active ingredient and the corn starch are mixed. The aqueous suspension is worked into this mixture and kneaded to a dough. The resulting mass is granulated through a 12 M sieve and dried.

II All 4 excipients are mixed thoroughly.

III The preliminary mixes obtained according to I and II are mixed and pressed into tablets or boli.

4. Injectables

A. Oily vehicle (slow release)

1.	active ingredient	0.1-1.0 g
	groundnut oil	ad 100 ml
2.	active ingredient	0.1-1.0 g
	sesame oil	ad 100 ml

Preparation: The active ingredient is dissolved in part of the oil whilst stirring and, if required, with gentle heating, then after cooling made up to the desired volume and sterile-filtered through a suitable membrane filter with a pore size of 0.22 mm.

B Water-miscible solvent (average rate of release)

active ingredient	0.1-1.0 g
4-hydroxymethyl-1,3-dioxolane (glycerol formal)	40 g
1,2-propanediol	ad 100 ml
active ingredient	0.1-1.0 g
glycerol dimethyl ketal	40 g
1,2-propanediol	ad 100 ml

Preparation: The active ingredient is dissolved in part of the solvent whilst stirring, made up to the desired volume and sterile-filtered through a suitable membrane filter with a pore size of 0.22 mm.

C. Aqueous solubilisate (rapid release)

1.	active ingredient	0.1-1.0 g
	polyethoxylated castor oil (40 ethylene oxide units)	10 g
	1,2-propanediol	20 g
	benzyl alcohol	1 g
	aqua ad inject.	ad 100 ml
2.	active ingredient	0.1-1.0 g
	polyethoxylated sorbitan monooleate (20 ethylene oxide units)	8 g
	4-hydroxymethyl-1,3-dioxolane (glycerol formal)	20 g
	benzyl alcohol	1 g
	aqua ad inject.	ad 100 ml

Preparation: The active ingredient is dissolved in the solvents and the surfactant, and made up with water to the desired volume. Sterile filtration through an appropriate membrane filter of 0.22 mm pore size.

5. Pour on

A.	
active ingredient	5 g
isopropyl myristate	10 g
isopropanol	ad 100 ml
B	
active ingredient	2 g
hexyl laurate	5 g
medium-chained triglyceride	15 g
ethanol	ad 100 ml
C.	
active ingredient	2 g
oleyl oleate	5 g
N-methyl-pyrrolidone	40 g
isopropanol	ad 100 ml

The aqueous systems may also preferably be used for oral and/or intraruminal application.

The compositions may also contain further additives, such as stabilisers, e.g. where appropriate epoxidised vegetable oils (epoxidised coconut oil, rapeseed oil, or soybean oil); antifoams, e.g. silicone oil, preservatives, viscosity regulators, binders, tackifiers, as well as fertilisers or other active ingredients to achieve special effects.

Further biologically active substances or additives, which are neutral towards the compounds of formula I and do not have a harmful effect on the host animal to be treated, as well as mineral salts or vitamins, may also be added to the described compositions.

The following examples serve to illustrate the invention. They do not limit the invention. The letter 'h' stands for hour.

Preparation examples

Example 1: N-[1-cyano-1-methyl-2-(5-chlorobenzotriazol-1-yl)-ethyl]-4-trifluoromethoxy-benzamide

a) A mixture of 5 g of 5-chlorobenzotriazole, 1.4 g of chloroacetone, 5.1 g of potassium carbonate and 0.5 g of potassium iodide is stirred into 50 ml of acetone at room temperature for 48 h. The mixture is subsequently filtered, the filtrate concentrated by evaporation in a vacuum, and the residue purified by flash chromatography. In this way, two isomeric

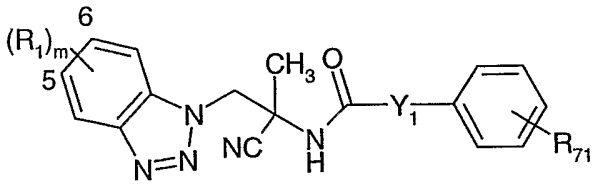
products, 1-(5-chlorobenzotriazol-1-yl)-propan-2-one and 1-(6-chlorobenzotriazol-1-yl)-propan-2-one, are isolated in approximately the same quantities, the first of which is then used directly in the next step.

b) 240 mg of 1-(5-chlorobenzotriazol-1-yl)-propan-2-one are dissolved in 4 ml of a 2-molar solution of ammonia in ethanol, then 64 mg of sodium cyanide and 91 mg of ammonium chloride are added and the mixture is stirred over night at room temperature. The reaction mixture is subsequently concentrated by evaporation in a vacuum, dissolved again in ethyl acetate, and washed with water and saturated sodium chloride solution. The organic phase is separated, dried with magnesium sulphate and concentrated by evaporation. 2-amino-3-(5-chlorobenzotriazol-1-yl)-2-methylpropionitrile is thus obtained.

c) 258 mg of 2-amino-3-(5-chlorobenzotriazol-1-yl)-2-methylpropionitrile are dissolved in 8 ml of dry dichloromethane, mixed with 194 mg of ethyl diisopropylamine, 16 mg of 4-dimethyl-aminopyridine and 292 mg of 4-(2-trifluoromethoxy)-benzoyl chloride and subsequently stirred for 7 h at room temperature. Subsequently, the reaction mixture is diluted with ethyl acetate, then washed with a saturated sodium bicarbonate solution and with saturated sodium chloride solution. After drying the organic phase with magnesium sulphate and concentrating by evaporation, the residue is recrystallised in diethylether. In this way, the title compound is obtained with a melting point of 135°C.

The substances named in the following table may also be prepared analogously to the above-described method. The values of the melting points are indicated in °C. Bd. signifies a direct bond.

Table 1



No.	Y_1	$(R_1)_m$	R_{71}	phys. data
1.1	Bd.	H	H	
1.2	Bd.	H	2-Cl	
1.3	Bd.	H	3-Cl	
1.4	Bd.	H	4-Cl	
1.5	Bd.	H	2-F	
1.6	Bd.	H	3-F	
1.7	Bd.	H	4-F	
1.8	Bd.	H	2-CH_3	
1.9	Bd.	H	3-CH_3	
1.10	Bd.	H	4-CH_3	
1.11	Bd.	H	2-OCH_3	
1.12	Bd.	H	3-OCH_3	
1.13	Bd.	H	4-OCH_3	
1.14	Bd.	H	2-CF_3	
1.15	Bd.	H	3-CF_3	
1.16	Bd.	H	4-CF_3	
1.17	Bd.	H	2-OCF_3	
1.18	Bd.	H	3-OCF_3	
1.19	Bd.	H	4-OCF_3	
1.20	Bd.	H	2-OCF_2CF_2	
1.21	Bd.	H	3-OCF_2CF_2	
1.22	Bd.	H	4-OCF_2CF_2	
1.23	Bd.	H	2-OC_2F_5	
1.24	Bd.	H	3-OC_2F_5	
1.25	Bd.	H	4-OC_2F_5	
1.26	Bd.	H	2-OC_6H_5	
1.27	Bd.	H	3-OC_6H_5	
1.28	Bd.	H	4-OC_6H_5	
1.29	Bd.	H	2-$C(O)C_6H_5$	
1.30	Bd.	H	3-$C(O)C_6H_5$	
1.31	Bd.	H	4-$C(O)C_6H_5$	
1.32	Bd.	H	4-CN	
1.33	Bd.	5-Cl	H	
1.34	Bd.	5-Cl	2-Cl	
1.35	Bd.	5-Cl	3-Cl	
1.36	Bd.	5-Cl	4-Cl	
1.37	Bd.	5-Cl	2-F	
1.38	Bd.	5-Cl	3-F	
1.39	Bd.	5-Cl	4-F	
1.40	Bd.	5-Cl	2-CH_3	

1.41	Bd.	5-Cl	3-CH_3	
1.42	Bd.	5-Cl	4-CH_3	
1.43	Bd.	5-Cl	2-OCH_3	
1.44	Bd.	5-Cl	3-OCH_3	
1.45	Bd.	5-Cl	4-OCH_3	
1.46	Bd.	5-Cl	2-CF_3	
1.47	Bd.	5-Cl	3-CF_3	
1.48	Bd.	5-Cl	4-CF_3	
1.49	Bd.	5-Cl	2-OCF_3	
1.50	Bd.	5-Cl	3-OCF_3	
1.51	Bd.	5-Cl	4-OCF_3	m.p. 135°
1.52	Bd.	5-Cl	2-OCF_2CF_2	
1.53	Bd.	5-Cl	3-OCF_2CF_2	
1.54	Bd.	5-Cl	4-OCF_2CF_2	
1.55	Bd.	5-Cl	2-OC_2F_5	
1.56	Bd.	5-Cl	3-OC_2F_5	
1.57	Bd.	5-Cl	4-OC_2F_5	
1.58	Bd.	5-Cl	2-OC_6H_5	
1.59	Bd.	5-Cl	3-OC_6H_5	
1.60	Bd.	5-Cl	4-OC_6H_5	
1.61	Bd.	5-Cl	2-$C(O)C_6H_5$	
1.62	Bd.	5-Cl	3-$C(O)C_6H_5$	
1.63	Bd.	5-Cl	4-$C(O)C_6H_5$	
1.64	Bd.	5-Cl	4-CN	
1.65	Bd.	6-Cl	H	
1.66	Bd.	6-Cl	2-Cl	
1.67	Bd.	6-Cl	3-Cl	
1.68	Bd.	6-Cl	4-Cl	
1.69	Bd.	6-Cl	2-F	
1.70	Bd.	6-Cl	3-F	
1.71	Bd.	6-Cl	4-F	
1.72	Bd.	6-Cl	2-CH_3	
1.73	Bd.	6-Cl	3-CH_3	
1.74	Bd.	6-Cl	4-CH_3	
1.75	Bd.	6-Cl	2-OCH_3	
1.76	Bd.	6-Cl	3-OCH_3	
1.77	Bd.	6-Cl	4-OCH_3	
1.78	Bd.	6-Cl	2-CF_3	
1.79	Bd.	6-Cl	3-CF_3	
1.80	Bd.	6-Cl	4-CF_3	
1.81	Bd.	6-Cl	2-OCF_3	
1.82	Bd.	6-Cl	3-OCF_3	
1.83	Bd.	6-Cl	4-OCF_3	m.p. 124°
1.84	Bd.	6-Cl	2-OCF_2CF_2	
1.85	Bd.	6-Cl	3-OCF_2CF_2	
1.86	Bd.	6-Cl	4-OCF_2CF_2	
1.87	Bd.	6-Cl	2-OC_2F_5	
1.88	Bd.	6-Cl	3-OC_2F_5	
1.89	Bd.	6-Cl	4-OC_2F_5	
1.90	Bd.	6-Cl	2-OC_6H_5	

1.91	Bd.	6-Cl	3-OC_6H_5	
1.92	Bd.	6-Cl	4-OC_6H_5	
1.93	Bd.	6-Cl	2-$C(O)C_6H_5$	
1.94	Bd.	6-Cl	3-$C(O)C_6H_5$	
1.95	Bd.	6-Cl	4-$C(O)C_6H_5$	
1.96	Bd.	6-Cl	4-CN	
1.97	Bd.	5-Cl, 6-F	H	
1.98	Bd.	5-Cl, 6-F	2-Cl	
1.99	Bd.	5-Cl, 6-F	3-Cl	
1.100	Bd.	5-Cl, 6-F	4-Cl	
1.101	Bd.	5-Cl, 6-F	2-F	
1.102	Bd.	5-Cl, 6-F	3-F	
1.103	Bd.	5-Cl, 6-F	4-F	
1.104	Bd.	5-Cl, 6-F	2-CH_3	
1.105	Bd.	5-Cl, 6-F	3-CH_3	
1.106	Bd.	5-Cl, 6-F	4-CH_3	
1.107	Bd.	5-Cl, 6-F	2-OCH_3	
1.108	Bd.	5-Cl, 6-F	3-OCH_3	
1.109	Bd.	5-Cl, 6-F	4-OCH_3	
1.110	Bd.	5-Cl, 6-F	2-CF_3	
1.111	Bd.	5-Cl, 6-F	3-CF_3	
1.112	Bd.	5-Cl, 6-F	4-CF_3	
1.113	Bd.	5-Cl, 6-F	2-OCF_3	
1.114	Bd.	5-Cl, 6-F	3-OCF_3	
1.115	Bd.	5-Cl, 6-F	4-OCF_3	solid
1.116	Bd.	5-Cl, 6-F	2-OCF_2CF_2	
1.117	Bd.	5-Cl, 6-F	3-OCF_2CF_2	
1.118	Bd.	5-Cl, 6-F	4-OCF_2CF_2	
1.119	Bd.	5-Cl, 6-F	2-OC_2F_5	
1.120	Bd.	5-Cl, 6-F	3-OC_2F_5	
1.121	Bd.	5-Cl, 6-F	4-OC_2F_5	
1.122	Bd.	5-Cl, 6-F	2-OC_6H_5	
1.123	Bd.	5-Cl, 6-F	3-OC_6H_5	
1.124	Bd.	5-Cl, 6-F	4-OC_6H_5	
1.125	Bd.	5-Cl, 6-F	2-$C(O)C_6H_5$	
1.126	Bd.	5-Cl, 6-F	3-$C(O)C_6H_5$	
1.127	Bd.	5-Cl, 6-F	4-$C(O)C_6H_5$	
1.128	Bd.	5-Cl, 6-F	4-CN	
1.129	Bd.	6-Cl, 5-F	H	
1.130	Bd.	6-Cl, 5-F	2-Cl	
1.131	Bd.	6-Cl, 5-F	3-Cl	
1.132	Bd.	6-Cl, 5-F	4-Cl	
1.133	Bd.	6-Cl, 5-F	2-F	
1.134	Bd.	6-Cl, 5-F	3-F	
1.135	Bd.	6-Cl, 5-F	4-F	
1.136	Bd.	6-Cl, 5-F	2-CH_3	
1.137	Bd.	6-Cl, 5-F	3-CH_3	
1.138	Bd.	6-Cl, 5-F	4-CH_3	
1.139	Bd.	6-Cl, 5-F	2-OCH_3	
1.140	Bd.	6-Cl, 5-F	3-OCH_3	

1.141	Bd.	6-Cl, 5-F	4-OCH_3	
1.142	Bd.	6-Cl, 5-F	2-CF_3	
1.143	Bd.	6-Cl, 5-F	3-CF_3	
1.144	Bd.	6-Cl, 5-F	4-CF_3	
1.145	Bd.	6-Cl, 5-F	2-OCF_3	
1.146	Bd.	6-Cl, 5-F	3-OCF_3	
1.147	Bd.	6-Cl, 5-F	4-OCF_3	solid
1.148	Bd.	6-Cl, 5-F	2-OCF_2CF_2	
1.149	Bd.	6-Cl, 5-F	3-OCF_2CF_2	
1.150	Bd.	6-Cl, 5-F	4-OCF_2CF_2	
1.151	Bd.	6-Cl, 5-F	2-OC_2F_5	
1.152	Bd.	6-Cl, 5-F	3-OC_2F_5	
1.153	Bd.	6-Cl, 5-F	4-OC_2F_5	
1.154	Bd.	6-Cl, 5-F	2-OC_6H_5	
1.155	Bd.	6-Cl, 5-F	3-OC_6H_5	
1.156	Bd.	6-Cl, 5-F	4-OC_6H_5	
1.157	Bd.	6-Cl, 5-F	2-$C(O)C_6H_5$	
1.158	Bd.	6-Cl, 5-F	3-$C(O)C_6H_5$	
1.159	Bd.	6-Cl, 5-F	4-$C(O)C_6H_5$	
1.160	Bd.	6-Cl, 5-F	4-CN	
1.161	CH_2O	H	H	
1.162	CH_2O	H	2-Cl	
1.163	CH_2O	H	3-Cl	
1.164	CH_2O	H	4-Cl	
1.165	CH_2O	H	2-F	
1.166	CH_2O	H	3-F	
1.167	CH_2O	H	4-F	
1.168	CH_2O	H	2-CH_3	
1.169	CH_2O	H	3-CH_3	
1.170	CH_2O	H	4-CH_3	
1.171	CH_2O	H	2-OCH_3	
1.172	CH_2O	H	3-OCH_3	
1.173	CH_2O	H	4-OCH_3	
1.174	CH_2O	H	2-CF_3	
1.175	CH_2O	H	3-CF_3	
1.176	CH_2O	H	4-CF_3	
1.177	CH_2O	H	2-OCF_3	
1.178	CH_2O	H	3-OCF_3	
1.179	CH_2O	H	4-OCF_3	
1.180	CH_2O	H	2-OCF_2CF_2	
1.181	CH_2O	H	3-OCF_2CF_2	
1.182	CH_2O	H	4-OCF_2CF_2	
1.183	CH_2O	H	2-OC_2F_5	
1.184	CH_2O	H	3-OC_2F_5	
1.185	CH_2O	H	4-OC_2F_5	
1.186	CH_2O	H	2-OC_6H_5	
1.187	CH_2O	H	3-OC_6H_5	
1.188	CH_2O	H	4-OC_6H_5	
1.189	CH_2O	H	2-$C(O)C_6H_5$	
1.190	CH_2O	H	3-$C(O)C_6H_5$	

1.191	CH_2O	H	4-$C(O)C_6H_5$
1.192	CH_2O	H	4-CN
1.193	CH_2O	5-Cl	H
1.194	CH_2O	5-Cl	2-Cl
1.195	CH_2O	5-Cl	3-Cl
1.196	CH_2O	5-Cl	4-Cl
1.197	CH_2O	5-Cl	2-F
1.198	CH_2O	5-Cl	3-F
1.199	CH_2O	5-Cl	4-F
1.200	CH_2O	5-Cl	2-CH_3
1.201	CH_2O	5-Cl	3-CH_3
1.202	CH_2O	5-Cl	4-CH_3
1.203	CH_2O	5-Cl	2-OCH_3
1.204	CH_2O	5-Cl	3-OCH_3
1.205	CH_2O	5-Cl	4-OCH_3
1.206	CH_2O	5-Cl	2-CF_3
1.207	CH_2O	5-Cl	3-CF_3
1.208	CH_2O	5-Cl	4-CF_3
1.209	CH_2O	5-Cl	2-OCF_3
1.210	CH_2O	5-Cl	3-OCF_3
1.211	CH_2O	5-Cl	4-OCF_3
1.212	CH_2O	5-Cl	2-OCF_2CF_2
1.213	CH_2O	5-Cl	3-OCF_2CF_2
1.214	CH_2O	5-Cl	4-OCF_2CF_2
1.215	CH_2O	5-Cl	2-OC_2F_5
1.216	CH_2O	5-Cl	3-OC_2F_5
1.217	CH_2O	5-Cl	4-OC_2F_5
1.218	CH_2O	5-Cl	2-OC_6H_5
1.219	CH_2O	5-Cl	3-OC_6H_5
1.220	CH_2O	5-Cl	4-OC_6H_5
1.221	CH_2O	5-Cl	2-$C(O)C_6H_5$
1.222	CH_2O	5-Cl	3-$C(O)C_6H_5$
1.223	CH_2O	5-Cl	4-$C(O)C_6H_5$
1.224	CH_2O	5-Cl	4-CN
1.225	CH_2O	6-Cl	H
1.226	CH_2O	6-Cl	2-Cl
1.227	CH_2O	6-Cl	3-Cl
1.228	CH_2O	6-Cl	4-Cl
1.229	CH_2O	6-Cl	2-F
1.230	CH_2O	6-Cl	3-F
1.231	CH_2O	6-Cl	4-F
1.232	CH_2O	6-Cl	2-CH_3
1.233	CH_2O	6-Cl	3-CH_3
1.234	CH_2O	6-Cl	4-CH_3
1.235	CH_2O	6-Cl	2-OCH_3
1.236	CH_2O	6-Cl	3-OCH_3
1.237	CH_2O	6-Cl	4-OCH_3
1.238	CH_2O	6-Cl	2-CF_3
1.239	CH_2O	6-Cl	3-CF_3
1.240	CH_2O	6-Cl	4-CF_3

1.241	CH_2O	6-Cl	2-OCF_3
1.242	CH_2O	6-Cl	3-OCF_3
1.243	CH_2O	6-Cl	4-OCF_3
1.244	CH_2O	6-Cl	2-OCF_2CF_2
1.245	CH_2O	6-Cl	3-OCF_2CF_2
1.246	CH_2O	6-Cl	4-OCF_2CF_2
1.247	CH_2O	6-Cl	2-OC_2F_5
1.248	CH_2O	6-Cl	3-OC_2F_5
1.249	CH_2O	6-Cl	4-OC_2F_5
1.250	CH_2O	6-Cl	2-OC_6H_5
1.251	CH_2O	6-Cl	3-OC_6H_5
1.252	CH_2O	6-Cl	4-OC_6H_5
1.253	CH_2O	6-Cl	2-$C(O)C_6H_5$
1.254	CH_2O	6-Cl	3-$C(O)C_6H_5$
1.255	CH_2O	6-Cl	4-$C(O)C_6H_5$
1.256	CH_2O	6-Cl	4-CN
1.257	CH_2O	5-Cl, 6-F	H
1.258	CH_2O	5-Cl, 6-F	2-Cl
1.259	CH_2O	5-Cl, 6-F	3-Cl
1.260	CH_2O	5-Cl, 6-F	4-Cl
1.261	CH_2O	5-Cl, 6-F	2-F
1.262	CH_2O	5-Cl, 6-F	3-F
1.263	CH_2O	5-Cl, 6-F	4-F
1.264	CH_2O	5-Cl, 6-F	2-CH_3
1.265	CH_2O	5-Cl, 6-F	3-CH_3
1.266	CH_2O	5-Cl, 6-F	4-CH_3
1.267	CH_2O	5-Cl, 6-F	2-OCH_3
1.268	CH_2O	5-Cl, 6-F	3-OCH_3
1.269	CH_2O	5-Cl, 6-F	4-OCH_3
1.270	CH_2O	5-Cl, 6-F	2-CF_3
1.271	CH_2O	5-Cl, 6-F	3-CF_3
1.272	CH_2O	5-Cl, 6-F	4-CF_3
1.273	CH_2O	5-Cl, 6-F	2-OCF_3
1.274	CH_2O	5-Cl, 6-F	3-OCF_3
1.275	CH_2O	5-Cl, 6-F	4-OCF_3
1.276	CH_2O	5-Cl, 6-F	2-OCF_2CF_2
1.277	CH_2O	5-Cl, 6-F	3-OCF_2CF_2
1.278	CH_2O	5-Cl, 6-F	4-OCF_2CF_2
1.279	CH_2O	5-Cl, 6-F	2-OC_2F_5
1.280	CH_2O	5-Cl, 6-F	3-OC_2F_5
1.281	CH_2O	5-Cl, 6-F	4-OC_2F_5
1.282	CH_2O	5-Cl, 6-F	2-OC_6H_5
1.283	CH_2O	5-Cl, 6-F	3-OC_6H_5
1.284	CH_2O	5-Cl, 6-F	4-OC_6H_5
1.285	CH_2O	5-Cl, 6-F	2-$C(O)C_6H_5$
1.286	CH_2O	5-Cl, 6-F	3-$C(O)C_6H_5$
1.287	CH_2O	5-Cl, 6-F	4-$C(O)C_6H_5$
1.288	CH_2O	5-Cl, 6-F	4-CN
1.289	CH_2O	6-Cl, 5-F	H
1.290	CH_2O	6-Cl, 5-F	2-Cl

1.291	CH_2O	6-Cl, 5-F	3-Cl
1.292	CH_2O	6-Cl, 5-F	4-Cl
1.293	CH_2O	6-Cl, 5-F	2-F
1.294	CH_2O	6-Cl, 5-F	3-F
1.295	CH_2O	6-Cl, 5-F	4-F
1.296	CH_2O	6-Cl, 5-F	2-CH_3
1.297	CH_2O	6-Cl, 5-F	3-CH_3
1.298	CH_2O	6-Cl, 5-F	4-CH_3
1.299	CH_2O	6-Cl, 5-F	2-OCH_3
1.300	CH_2O	6-Cl, 5-F	3-OCH_3
1.301	CH_2O	6-Cl, 5-F	4-OCH_3
1.302	CH_2O	6-Cl, 5-F	2-CF_3
1.303	CH_2O	6-Cl, 5-F	3-CF_3
1.304	CH_2O	6-Cl, 5-F	4-CF_3
1.305	CH_2O	6-Cl, 5-F	2-OCF_3
1.306	CH_2O	6-Cl, 5-F	3-OCF_3
1.307	CH_2O	6-Cl, 5-F	4-OCF_3
1.308	CH_2O	6-Cl, 5-F	2-OCF_2CF_2
1.309	CH_2O	6-Cl, 5-F	3-OCF_2CF_2
1.310	CH_2O	6-Cl, 5-F	4-OCF_2CF_2
1.311	CH_2O	6-Cl, 5-F	2-OC_2F_5
1.312	CH_2O	6-Cl, 5-F	3-OC_2F_5
1.313	CH_2O	6-Cl, 5-F	4-OC_2F_5
1.314	CH_2O	6-Cl, 5-F	2-OC_6H_5
1.315	CH_2O	6-Cl, 5-F	3-OC_6H_5
1.316	CH_2O	6-Cl, 5-F	4-OC_6H_5
1.317	CH_2O	6-Cl, 5-F	2-$C(O)C_6H_5$
1.318	CH_2O	6-Cl, 5-F	3-$C(O)C_6H_5$
1.319	CH_2O	6-Cl, 5-F	4-$C(O)C_6H_5$
1.320	CH_2O	6-Cl, 5-F	4-CN

Biological Examples:

1. In-vivo test on *Trichostrongylus colubriformis* and *Haemonchus contortus* on Mongolian gerbils (*Meriones unguiculatus*) using peroral application

Six to eight week old Mongolian gerbils are infected by artificial feeding with ca. 2000 third instar larvae each of *T. colubriformis* and *H. contortus*. 6 days after infection, the gerbils are lightly anaesthetised with N_2O and treated by peroral application with the test compounds, dissolved in a mixture of 2 parts DMSO and 1 part polyethylene glycol (PEG 300), in quantities of 100, 32 and 10 -0.1 mg/kg. On day 9 (3 days after treatment), when most of the *H. contortus* that are still present are late 4th instar larvae and most of the *T. colubriformis* are immature adults, the gerbils are killed in order to count the worms. The efficacy is calculated as the % reduction of the number of worms in each gerbil, compared with the geometric average of number of worms from 8 infected and untreated gerbils.

In this test, a vast reduction in nematode infestation is achieved with compounds of formula I, especially from Table 1.

To examine the insecticidal and/or acaricidal activity of the compounds of formula I on animals and plants, the following test methods may be used.

2. Activity on L_1 larvae of *Lucilia sericata*

1 ml of an aqueous suspension of the active substance to be tested is admixed with 3 ml of a special larvae growth medium at ca. 50°C, so that a homogenate of either 250 or 125 ppm of active ingredient content is obtained. Ca. 30 *Lucilia* larvae (L_1) are used in each test tube sample. After 4 days, the mortality rate is determined.

3. Acaricidal activity on *Boophilus microplus* (Biarra strain)

A piece of sticky tape is attached horizontally to a PVC sheet, so that 10 fully engorged female ticks of *Boophilus microplus* (Biarra strain) can be adhered thereto by their backs, side by side, in a row. Using an injection needle, 1 µl of a liquid is injected into each tick. The liquid is a 1:1 mixture of polyethylene glycol and acetone and it contains, dissolved therein, a certain amount of active ingredient chosen from 1, 0.1 or 0.01 µg per tick. Control animals are given an injection without active ingredient. After treatment, the animals are kept under normal conditions in an insectarium at ca. 28°C and at 80% relative humidity until oviposition takes place and the larvae have hatched from the eggs of the control animals. The activity of a tested substance is determined by IR_{90}, i.e. an evaluation is made of the dosage of active

ingredient at which 9 out of 10 female ticks (=90%) lay eggs that are infertile even after 30 days.

4. *In vitro* efficacy on engorged female *Boophilus microplus* (BIARRA):

4x10 engorged female ticks of the OP-resistant BIARRA strain are adhered to a sticky strip and covered for 1 hour with a cotton-wool ball soaked in an emulsion or suspension of the test compound in concentrations of 500, 125, 31 and 8 ppm respectively. Evaluation takes place 28 days later based on mortality, oviposition and hatched larvae.

An indication of the activity of the test compounds is shown by the number of females that
- die quickly before laying eggs,
- survive for some time without laying eggs,
- lay eggs in which no embryos are formed,
- lay eggs in which embryos form, from which no larvae hatch, and
- lay eggs in which embryos form, from which larvae normally hatch within 26 to 27 days.

5. *In vitro* efficacy on nymphs of *Amblyomma hebraeum*

About 5 fasting nymphs are placed in a polystyrene test tube containing 2 ml of the test compound in solution, suspension or emulsion.

After immersion for 10 minutes, and shaking for 2x10 seconds on a vortex mixer, the test tubes are blocked up with a tight wad of cotton wool and rotated. As soon as all the liquid has been soaked up by the cotton wool ball, it is pushed half-way into the test tube which is still being rotated, so that most of the liquid is squeezed out of the cotton-wool ball and flows into a Petri dish below.

The test tubes are then kept at room temperature in a room with daylight until evaluated. After 14 days, the test tubes are immersed in a beaker of boiling water. If the ticks begin to move in reaction to the heat, the test substance is inactive at the tested concentration, otherwise the ticks are regarded as dead and the test substances regarded as active at the tested concentration. All substances are tested in a concentration range of 0.1 to 100 ppm.

6. Activity against *Dermanyssus gallinae*

2 to 3 ml of a solution containing 10 ppm active ingredient, and ca. 200 mites (*Dermanyssus gallinae*) at different stages of development are added to a glass container which is open at the top. Then the container is closed with a wad of cotton wool, shaken for 10 minutes until the mites are completely wet, and then inverted briefly so that the remaining test solution can

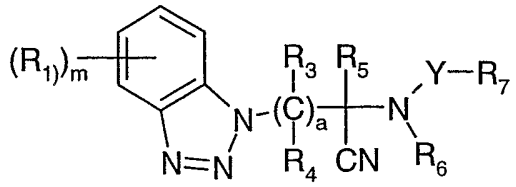
be absorbed by the cotton wool. After 3 days, the mortality of the mites is determined by counting the dead individuals and indicated as a percentage.

7. Activity against *Musca domestica*

A sugar cube is treated with a solution of the test substance in such a way that the concentration of test substance in the sugar, after drying over night, is 250 ppm. The cube treated in this way is placed on an aluminium dish with wet cotton wool and 10 adult *Musca domestica* of an OP-resistant strain, covered with a beaker and incubated at 25°C. The mortality rate is determined after 24 hours.

What we claim is:

1. A compound of formula



I,

wherein

R_1 signifies halogen, cyano, nitro, C_1-C_6-alkyl, C_3-C_6-cycloalkyl, halo-C_1-C_6-alkyl, C_1-C_6-alkylthio, arylthio, C_1-C_6-alkoxy, C_3-C_6-cycloalkyloxy, halo-C_1-C_6-alkoxy, C_1-C_6-alkylcarbonyl, halo-C_1-C_6-alkylcarbonyl, C_1-C_6-alkylsulfinyl, C_1-C_6-alkylsulfonyl, C_1-C_6-alkylamino, di(C_1-C_6-alkyl)amino, unsubstituted or substituted aryl or unsubstituted or substituted phenoxy, whereby the substituents may each be independent of one another and are selected from the group consisting of halogen, nitro, cyano, C_1-C_6-alkyl, halo-C_1-C_6-alkyl, C_1-C_6-alkoxy, halo-C_1-C_6-alkoxy, C_1-C_6-alkylthio, halo-C_1-C_6-alkylthio, C_1-C_6-alkylsulfinyl, halo-C_1-C_6-alkylsulfinyl, C_1-C_6-alkylsulfonyl and halo-C_1-C_6-alkylsulfonyl;

R_3, R_4 und R_5 either, independently of one another, signify hydrogen, halogen, C_1-C_6-alkyl, halo-C_1-C_6-alkyl; C_3-C_6-cycloalkyl that is either unsubstituted or substituted once or many times, whereby the substituents may be independent of one another and are selected from the group consisting of halogen and C_1-C_6-alkyl; phenyl that is either unsubstituted or substituted once or many times, whereby the substituents may be independent of one another and are selected from the group consisting of halogen, nitro, cyano, C_1-C_6-alkyl, halo-C_1-C_6-alkyl, C_1-C_6-alkoxy, halo-C_1-C_6-alkoxy, C_1-C_6-alkylthio, halo-C_1-C_6-alkylthio, C_1-C_6-alkylsulfinyl, halo-C_1-C_6-alkylsulfinyl, C_1-C_6-alkylsulfonyl, halo-C_1-C_6-alkylsulfonyl, C_1-C_6-alkylamino or di-(C_1-C_6-alkyl)amino;
or R_4 and R_5 together signify C_2-C_6-alkylene;

R_6 signifies hydrogen, C_1-C_6-alkyl, C_1-C_6-alkylcarbonyl, C_1-C_6-alkoxy-C_1-C_6-alkyl, aminocarbonyl, C_1-C_6-alkoxycarbonyl, halo-C_1-C_6-alkylcarbonyl, thio-C_1-C_6-alkylcarbonyl or benzyl;

R_7 signifies hydrogen, C_1-C_6-alkyl, C_1-C_6-alkoxy, C_1-C_6-alkylamino, di(C_1-C_6-alkyl)amino, piperonyl, phenyl which is unsubstituted or substituted once or many times, whereby the substituents may be independent of one another and are selected from the group consisting of halogen, nitro, cyano, C_1-C_6-alkyl, C_3-C_6-cycloalkyl, halo-C_1-C_6-alkyl, C_1-C_6-alkoxy, C_3-C_6-

cycloalkyloxy, halo-C_1-C_6-alkoxy, C_2-C_6-alkenyl, halo-C_2-C_6-alkenyl, C_2-C_6-alkinyl, C_3-C_6-cycloalkyl, C_2-C_6-alkenyloxy, halo-C_2-C_6-alkenyloxy, C_1-C_6-alkylthio, halo-C_1-C_6-alkylthio, C_1-C_6-alkylsulfonyloxy, halo-C_1-C_6-alkylsulfonyloxy, C_1-C_6-alkylsulfinyl, halo-C_1-C_6-alkylsulfinyl, C_1-C_6-alkylsulfonyl, halo-C_1-C_6-alkylsulfonyl, C_2-C_6-alkenylthio, halo-C_2-C_6-alkenylthio, C_2-C_6-alkenylsulfinyl, halo-C_2-C_6-alkenylsulfinyl, C_2-C_6-alkenylsulfonyl, halo-C_2-C_6-alkenylsulfonyl, C_1-C_6-alkylamino, di(C_1-C_6-alkyl)amino, C_1-C_6-alkylsulfonylamino, halo-C_1-C_6-alkylsulfonylamino, C_1-C_6-alkylcarbonyl, halo-C_1-C_6-alkylcarbonyl, C_1-C_6-alkoxycarbonyl, C_1-C_6-alkylaminocarbonyl, di(C_1-C_6-alkyl)aminocarbonyl; aryl-C_1-C_6-alkyl which is unsubstituted or substituted once or many times, arylamino which is unsubstituted or substituted once or many times, arylcarbonyl which is unsubstituted or substituted once or many times, arylcarbonyloxy which is unsubstituted or substituted once or many times, aryloxy which is unsubstituted or substituted once or many times, aryloxy-C_1-C_6-alkyl which is unsubstituted or substituted once or many times, hetaryloxy-C_1-C_6-alkyl which is unsubstituted or substituted once or many times, aryloxycarbonyl which is unsubstituted or substituted once or many times, arylsulfonyl which is unsubstituted or substituted once or many times, arylsulfonylamino which is unsubstituted or substituted once or many times, pyridyloxy which is unsubstituted or substituted once or many times, and phenylacetylenyl which is unsubstituted or substituted once or many times, whereby the substituents may each be independent of one another and are selected from the group consisting of halogen, nitro, cyano, C_1-C_6-alkyl, halo-C_1-C_6-alkyl, C_1-C_6-alkoxy, halo-C_1-C_6-alkoxy, C_1-C_6-alkylthio, halo-C_1-C_6-alkylthio, C_1-C_6-alkylsulfinyl, halo-C_1-C_6-alkylsulfinyl, C_1-C_6-alkylsulfonyl and halo-C_1-C_6-alkylsulfonyl;

unsubstituted hetaryl or hetaryl which is substituted once or many times, whereby the substituents may be independent of one another and are selected from the group consisting of halogen, nitro, cyano, C_1-C_6-alkyl, halo-C_1-C_6-alkyl, C_1-C_6-alkoxy, halo-C_1-C_6-alkoxy, C_2-C_6-alkenyloxy, halo-C_2-C_6-alkenyloxy, C_1-C_6-alkylthio, halo-C_1-C_6-alkylthio, C_1-C_6-alkylsulfinyl, halo-C_1-C_6-alkylsulfinyl, C_2-C_6-alkenylthio, halo-C_2-C_6-alkenylthio, C_2-C_6-alkenylsulfinyl, halo-C_2-C_6-alkenylsulfinyl, C_1-C_6-alkylsulfonyl, halo-C_1-C_6-alkylsulfonyl, C_2-C_6-alkenylsulfonyl, halo-C_2-C_6-alkenylsulfonyl, C_1-C_6-alkylamino and di-(C_1-C_6-alkyl)amino;

or naphthyl or quinolyl which are unsubstituted or substituted once or many times, whereby the substituents may be independent of one another and are selected from the group consisting of halogen, nitro, cyano, C_1-C_6-alkyl, halo-C_1-C_6-alkyl, C_1-C_6-alkoxy, halo-C_1-C_6-alkoxy, C_2-C_6-alkenyloxy, halo-C_2-C_6-alkenyloxy, C_1-C_6-alkylthio, halo-C_1-C_6-alkylthio, C_1-C_6-alkylsulfinyl, halo-C_1-C_6-alkylsulfinyl, C_2-C_6-alkenylthio, halo-C_2-C_6-alkenylthio, C_2-C_6-

alkenylsulfinyl, halo-C_2-C_6-alkenylsulfinyl, C_1-C_6-alkylsulfonyl, halo-C_1-C_6-alkylsulfonyl, C_2-C_6-alkenylsulfonyl, halo-C_2-C_6-alkenylsulfonyl, C_1-C_6-alkylamino and di-(C_1-C_6-alkyl)amino;

R_8 and R_9, independently of one another, signify hydrogen, C_1-C_6-alkyl, C_1-C_6-alkoxycarbonyl, C_1-C_6-alkylcarbonyl, C_1-C_6-alkylthiocarbonyl, thio-C_1-C_6-alkylcarbonyl, aryl or hetaryl;

Y signifies a direct bond, C(O), C(S) or $S(O)_n$;

a signifies 1, 2 or 3;

m signifies 0, 1, 2, 3 or 4; and

n is 1 or 2.

2. A compound of formula I according to claim 1, wherein R_1 signifies halogen, cyano, nitro, C_1-C_4-alkyl, halo-C_1-C_4-alkyl, C_1-C_4-alkoxy, halo-C_1-C_4-alkoxy, C_1-C_4-alkylcarbonyl, halo-C_1-C_4-alkylcarbonyl, C_1-C_4-alkylsulfonyl or unsubstituted or substituted phenoxy, whereby the substituents may be independent of one another and are selected from the group consisting of halogen, nitro, cyano, C_1-C_4-alkyl, halo-C_1-C_4-alkyl, C_1-C_4-alkoxy and halo-C_1-C_4-alkoxy.

3. A compound of formula I according to claim 1, wherein R_1 signifies halogen, cyano, nitro, C_1-C_2-alkyl, halo-C_1-C_2-alkyl, C_1-C_2-alkoxy, halo-C_1-C_2-alkoxy or unsubstituted or substituted phenoxy, whereby the substituents may be independent of one another and are selected from the group consisting of halogen, C_1-C_4-alkyl, halo-C_1-C_4-alkyl, C_1-C_4-alkoxy and halo-C_1-C_4-alkoxy.

4. A compound of formula I according to claim 1, wherein R_1 signifies halogen, cyano, nitro, C_1-C_2-alkyl, halo-C_1-C_2-alkyl, C_1-C_2-alkoxy or halo-C_1-C_2-alkoxy.

5. A compound of formula I according to claim 1, wherein R_3, R_4 and R_5 are either, independently of one another, hydrogen, halogen, C_1-C_4-alkyl, halo-C_1-C_4-alkyl, C_3-C_6-cycloalkyl; phenyl that is either unsubstituted or substituted once or many times, whereby the substituents may be independent of one another and are selected from the group consisting of halogen, nitro, cyano, C_1-C_4-alkyl, halo-C_1-C_4-alkyl, C_1-C_4-alkoxy, halo-C_1-C_4-alkoxy; C_1-C_4-alkylthio and halo-C_1-C_4-alkylthio; or R_4 and R_5 together are C_2-C_6-alkylene.

6. A compound of formula I according to claim 1, wherein R_3, R_4 and R_5 are independently of one another, hydrogen, halogen, C_1-C_2-alkyl, halo-C_1-C_2-alkyl or C_3-C_6-cycloalkyl.

7. A compound of formula I according to claim 1, wherein R_3, R_4 and R_5 are independently of one another, hydrogen, methyl or halomethyl.

8. A compound of formula I according to claim 1, wherein R_6 is hydrogen, C_1-C_4-alkyl, C_1-C_4-alkylcarbonyl, C_1-C_6-alkoxy-C_1-C_6-alkyl or benzyl.

9. A compound of formula I according to claim 1, wherein R_6 is hydrogen, C_1-C_2-alkyl, C_1-C_2-alkylcarbonyl or benzyl.

10. A compound of formula I according to claim 1, wherein R_6 is hydrogen or C_1-C_2-alkyl.

11. A compound of formula I according to claim 1, wherein R_7 signifies phenyl which is unsubstituted or substituted once or many times, whereby the substituents may be independent of one another and are selected from the group consisting of halogen, nitro, cyano, C_1-C_4-alkyl, halo-C_1-C_4-alkyl, C_1-C_4-alkoxy, halo-C_1-C_4-alkoxy, C_2-C_4-alkenyl, halo-C_2-C_4-alkenyl, C_2-C_4-alkinyl, C_3-C_6-cycloalkyl, C_2-C_4-alkenyloxy, halo-C_2-C_4-alkenyloxy, C_1-C_4-alkylthio, halo-C_1-C_4-alkylthio, C_1-C_4-alkylsulfonyloxy, halo-C_1-C_4-alkylsulfonyloxy, C_1-C_4-alkylsulfonyl, halo-C_1-C_4-alkylsulfonyl, C_2-C_4-alkenylsulfonyl, halo-C_2-C_4-alkenylsulfonyl, C_1-C_4-alkylamino, di(C_1-C_4-alkyl)amino, C_1-C_4-alkylcarbonyl, halo-C_1-C_4-alkylcarbonyl, C_1-C_6-alkoxycarbonyl; aryl-C_1-C_4-alkyl which is unsubstituted or substituted once or many times, aryloxy which is unsubstituted or substituted once or many times, aryloxy-C_1-C_4-alkyl which is unsubstituted or substituted once or many times, hetaryloxy-C_1-C_4-alkyl which is unsubstituted or substituted once or many times, aryloxycarbonyl which is unsubstituted or substituted once or many times, arylsulfonyl which is unsubstituted or substituted once or many times, and pyridyloxy which is unsubstituted or substituted once or many times, whereby the substituents may each be independent of one another and are selected from the group consisting of halogen, nitro, cyano, C_1-C_4-alkyl, halo-C_1-C_4-alkyl, C_1-C_4-alkoxy, halo-C_1-C_4-alkoxy, C_{1-4}-alkylthio, halo-C_{1-4}-alkylthio, C_1-C_4-alkylsulfonyl and halo-C_1-C_4-alkylsulfonyl;

hetaryl which is unsubstituted or substituted once or many times, whereby the substituents may be independent of one another and are selected from the group consisting of halogen, nitro, cyano, C_1-C_4-alkyl, halo-C_1-C_4-alkyl, C_1-C_4-alkoxy, halo-C_1-C_4-alkoxy, C_2-C_4-alkenyloxy, halo-C_2-C_4-alkenyloxy, C_1-C_4-alkylthio, halo-C_1-C_4-alkylthio, C_1-C_4-alkylsulfonyl and halo-C_1-C_4-alkylsulfonyl; or

naphthyl or quinolyl which are unsubstituted or substituted once or many times, whereby the substituents may be independent of one another and are selected from the group consisting of halogen, nitro, cyano, C_1-C_4-alkyl, halo-C_1-C_4-alkyl, C_1-C_4-alkoxy, halo-C_1-C_4-alkoxy, C_2-C_4-alkenyloxy, halo-C_2-C_4-alkenyloxy, C_1-C_4-alkylthio, halo-C_1-C_4-alkylthio, C_2-C_4-alkenylthio, halo-C_2-C_4-alkenylthio, C_1-C_4-alkylsulfonyl and halo-C_1-C_4-alkylsulfonyl.

12. A compound of formula I according to claim 1, wherein R_7 signifies aryl which is unsubstituted or substituted once or many times, whereby the substituents may be independent of one another and are selected from the group consisting of halogen, nitro, cyano, C_1-C_2-alkyl, halo-C_1-C_2-alkyl, C_1-C_2-alkoxy, halo-C_1-C_2-alkoxy, C_3-C_5-cycloalkyl, C_1-C_2-alkylthio, halo-C_1-C_2-alkylthio, C_1-C_2-alkylsulfonyl, halo-C_1-C_2-alkylsulfonyl, C_1-C_2-alkylcarbonyl, halo-C_1-C_2-alkylcarbonyl, C_1-C_2-alkoxycarbonyl; aryl-C_1-C_2-alkyl which is unsubstituted or substituted once or many times, aryloxy which is unsubstituted or substituted once or many times, aryloxy-C_1-C_2-alkyl which is unsubstituted or substituted once or many times, and pyridyloxy which is unsubstituted or substituted once or many times, whereby the substituents may be independent of one another and are selected from the group consisting of halogen, nitro, cyano, C_1-C_2-alkyl, halo-C_1-C_2-alkyl, C_1-C_2-alkoxy, halo-C_1-C_2-alkoxy, C_1-C_2-alkylthio, halo-C_1-C_2-alkylthio, C_1-C_2-alkylsulfonyl and halo-C_1-C_2-alkylsulfonyl; or

hetaryl which is unsubstituted or substituted once or many times, whereby the substituents may be independent of one another and are selected from the group consisting of halogen, nitro, cyano, C_1-C_2-alkyl, halo-C_1-C_2-alkyl, C_1-C_2-alkoxy, halo-C_1-C_2-alkoxy, C_2-C_4-alkenyloxy, halo-C_2-C_4-alkenyloxy, C_1-C_2-alkylthio, halo-C_1-C_2-alkylthio, C_1-C_2-alkylsulfonyl and halo-C_1-C_2-alkylsulfonyl.

13. A compound of formula I according to claim 1, wherein R_7 signifies aryl which is unsubstituted or substituted once or many times, whereby the substituents may be independent of one another and are selected from the group consisting of halogen, cyano, C_1-C_2-alkyl, halo-C_1-C_2-alkyl, C_1-C_2-alkoxy, halo-C_1-C_2-alkoxy, C_3-C_5-cycloalkyl, C_1-C_2-alkylcarbonyl, halo-C_1-C_2-alkylcarbonyl, C_1-C_2-alkoxycarbonyl; aryl-C_1-C_2-alkyl which is unsubstituted or substituted once or many times, and aryloxy-C_1-C_2-alkyl which is unsubstituted or substituted once or many times, whereby the substituents may each be independent of one another and are selected from the group consisting of halogen, cyano, C_1-C_2-alkyl, halo-C_1-C_2-alkyl, C_1-C_2-alkoxy and halo-C_1-C_2-alkoxy.

14. A compound of formula I according to claim 1, wherein R_8 und R_9 independently of one another, signify hydrogen, C_1-C_6-alkyl, C_1-C_6-alkoxycarbonyl, C_1-C_6-alkylcarbonyl or aryl.

15. A compound of formula I according to claim 1, wherein R_8 und R_9 independently of one another, signify hydrogen or C_1-C_4-alkyl.

16. A compound of formula I according to claim 1, wherein R_8 und R_9 independently of one another, signify hydrogen or C_1-C_2-alkyl.

17. A compound of formula I according to claim 1, wherein Y is C(O) or $S(O)_n$.

18. A compound of formula I according to claim 1, wherein Y is C(O).

19. A compound of formula I according to claim 1, wherein a is 1 or 2.

20. A compound of formula I according to claim 1, wherein a is 1.

21. A compound of formula I according to claim 1, wherein m is 1, 2 or 3.

22. A compound of formula I according to claim 1, wherein m is 1 or 2.

23. A compound of formula I according to claim 1, wherein n is 2.

24. A compound of formula I according to claim 1, wherein

R_1 signifies halogen, cyano, nitro, C_1-C_4-alkyl, halo-C_1-C_4-alkyl, C_1-C_4-alkoxy, halo-C_1-C_4-alkoxy, C_1-C_4-alkylcarbonyl, halo-C_1-C_4-alkylcarbonyl, C_1-C_4-alkylsulfonyl or unsubstituted or substituted phenoxy, whereby the substituents may be independent of one another and are selected from the group consisting of halogen, nitro, cyano, C_1-C_4-alkyl, halo-C_1-C_4-alkyl, C_1-C_4-alkoxy and halo-C_1-C_4-alkoxy;

R_3, R_4 and R_5 , independently of one another, are hydrogen, halogen, C_1-C_4-alkyl, halo-C_1-C_4-alkyl, C_3-C_6-cycloalkyl; phenyl that is either unsubstituted or substituted once or many times, whereby the substituents may be independent of one another and are selected from the group consisting of halogen, nitro, cyano, C_1-C_4-alkyl, halo-C_1-C_4-alkyl, C_1-C_4-alkoxy, halo-C_1-C_4-alkoxy; C_1-C_4-alkylthio and halo-C_1-C_4-alkylthio; or R_4 and R_5 together are C_2-C_6-alkylene;

R_6 is hydrogen, C_1-C_4-alkyl, C_1-C_4-alkylcarbonyl, C_1-C_6-alkoxy-C_1-C_6-alkyl or benzyl;

R_7 signifies phenyl which is unsubstituted or substituted once or many times, whereby the substituents may be independent of one another and are selected from the group consisting of halogen, nitro, cyano, C_1-C_4-alkyl, halo-C_1-C_4-alkyl, C_1-C_4-alkoxy, halo-C_1-C_4-alkoxy, C_2-C_4-alkenyl, halo-C_2-C_4-alkenyl, C_2-C_4-alkinyl, C_3-C_6-cycloalkyl, C_2-C_4-alkenyloxy, halo-C_2-C_4-alkenyloxy, C_1-C_4-alkylthio, halo-C_1-C_4-alkylthio, C_1-C_4-alkylsulfonyloxy, halo-C_1-C_4-alkylsulfonyloxy, C_1-C_4-alkylsulfonyl, halo-C_1-C_4-alkylsulfonyl, C_2-C_4-alkenylsulfonyl, halo-C_2-C_4-alkenylsulfonyl, C_1-C_4-alkylamino, di(C_1-C_4-alkyl)amino, C_1-C_4-alkylcarbonyl, halo-C_1-C_4-alkylcarbonyl, C_1-C_6-alkoxycarbonyl; aryl-C_1-C_4-alkyl which is unsubstituted or substituted once or many times, aryloxy which is unsubstituted or substituted once or many times, aryloxy-C_1-C_4-alkyl which is unsubstituted or substituted once or many times, hetaryloxy-C_1-C_4-alkyl which is unsubstituted or substituted once or many times, aryloxycarbonyl which is

unsubstituted or substituted once or many times, arylsulfonyl which is unsubstituted or substituted once or many times, and pyridyloxy which is unsubstituted or substituted once or many times, whereby the substituents may each be independent of one another and are selected from the group consisting of halogen, nitro, cyano, C_1-C_4-alkyl, halo-C_1-C_4-alkyl, C_1-C_4-alkoxy, halo-C_1-C_4-alkoxy, C_1-C_4-alkylthio, halo-C_1-C_4-alkylthio, C_1-C_4-alkylsulfonyl and halo-C_1-C_4-alkylsulfonyl;

hetaryl which is unsubstituted or substituted once or many times, whereby the substituents may be independent of one another and are selected from the group consisting of halogen, nitro, cyano, C_1-C_4-alkyl, halo-C_1-C_4-alkyl, C_1-C_4-alkoxy, halo-C_1-C_4-alkoxy, C_2-C_4-alkenyloxy, halo-C_2-C_4-alkenyloxy, C_1-C_4-alkylthio, halo-C_1-C_4-alkylthio, C_1-C_4-alkylsulfonyl and halo-C_1-C_4-alkylsulfonyl; or

naphthyl or quinolyl which are unsubstituted or substituted once or many times, whereby the substituents may be independent of one another and are selected from the group consisting of halogen, nitro, cyano, C_1-C_4-alkyl, halo-C_1-C_4-alkyl, C_1-C_4-alkoxy, halo-C_1-C_4-alkoxy, C_2-C_4-alkenyloxy, halo-C_2-C_4-alkenyloxy, C_1-C_4-alkylthio, halo-C_1-C_4-alkylthio, C_2-C_4-alkenylthio, halo-C_2-C_4-alkenylthio, C_1-C_4-alkylsulfonyl and halo-C_1-C_4-alkylsulfonyl;

R_8 und R_9 independently of one another, signify hydrogen, C_1-C_6-alkyl, C_1-C_6-alkoxycarbonyl, C_1-C_6-alkylcarbonyl or aryl;

Y is C(O) or $S(O)_n$;

a signifies 1 or 2;

m is 1, 2 or 3 and

n signifies 2.

25. A compound of formula I according to claim 1, wherein

R_1 signifies halogen, cyano, nitro, C_1-C_2-alkyl, halo-C_1-C_2-alkyl, C_1-C_2-alkoxy, halo-C_1-C_2-alkoxy or unsubstituted or substituted phenoxy, whereby the substituents may be independent of one another and are selected from the group consisting of halogen, C_1-C_4-alkyl, halo-C_1-C_4-alkyl, C_1-C_4-alkoxy and halo-C_1-C_4-alkoxy;

R_3, R_4 and R_5, independently of one another, signify hydrogen, halogen, C_1-C_2-alkyl, halo-C_1-C_2-alkyl or C_3-C_6-cycloalkyl;

R_6 signifies hydrogen, C_1-C_2-alkyl, C_1-C_2-alkylcarbonyl or benzyl;

R_7 signifies phenyl which is unsubstituted or substituted once or many times, whereby the substituents may be independent of one another and are selected from the group consisting of halogen, nitro, cyano, C_1-C_2-alkyl, halo-C_1-C_2-alkyl, C_1-C_2-alkoxy, halo-C_1-C_2-alkoxy, C_3-C_5-cycloalkyl, C_1-C_2-alkylthio, halo-C_1-C_2-alkylthio, C_1-C_2-alkylsulfonyl, halo-C_1-C_2-alkylsulfonyl, C_1-C_2-alkylcarbonyl, halo-C_1-C_2-alkylcarbonyl, C_1-C_2-alkoxycarbonyl; aryl-C_1-C_2-alkyl which is unsubstituted or substituted once or many times, aryloxy which is unsubstituted or substituted once or many times, aryloxy-C_1-C_2-alkyl which is unsubstituted or substituted once or many times, and pyridyloxy which is unsubstituted or substituted once or many times, whereby the substituents may be independent of one another and are selected from the group consisting of halogen, nitro, cyano, C_1-C_2-alkyl, halo-C_1-C_2-alkyl, C_1-C_2-alkoxy, halo-C_1-C_2-alkoxy, C_1-C_2-alkylthio, halo-C_1-C_2-alkylthio, C_1-C_2-alkylsulfonyl and halo-C_1-C_2-alkylsulfonyl; or

hetaryl which is unsubstituted or substituted once or many times, whereby the substituents may be independent of one another and are selected from the group consisting of halogen, nitro, cyano, C_1-C_2-alkyl, halo-C_1-C_2-alkyl, C_1-C_2-alkoxy, halo-C_1-C_2-alkoxy, C_2-C_4-alkenyloxy, halo-C_2-C_4-alkenyloxy, C_1-C_2-alkylthio, halo-C_1-C_2-alkylthio, C_1-C_2-alkylsulfonyl and halo-C_1-C_2-alkylsulfonyl;

R_8 and R_9, independently of one another, signify hydrogen or C_1-C_4-alkyl;

Y signifies C(O);

a signifies 1; and

m is 1 or 2.

26. A compound of formula I according to claim 1, wherein

R_1 signifies halogen, cyano, nitro, C_1-C_2-alkyl, halo-C_1-C_2-alkyl, C_1-C_2-alkoxy or halo-C_1-C_2-alkoxy;

R_3, R_4 and R_5, independently of one another, signify hydrogen, methyl or halomethyl;

R_6 signifies hydrogen or C_1-C_2-alkyl;

R_7 signifies phenyl which is unsubstituted or substituted once or many times, whereby the substituents may be independent of one another and are selected from the group consisting of halogen, cyano, C_1-C_2-alkyl, halo-C_1-C_2-alkyl, C_1-C_2-alkoxy, halo-C_1-C_2-alkoxy, C_3-C_5-cycloalkyl, C_1-C_2-alkylcarbonyl, halo-C_1-C_2-alkylcarbonyl, C_1-C_2-alkoxycarbonyl; aryl-C_1-C_2-alkyl which is unsubstituted or substituted once or many times, and aryloxy-C_1-C_2-alkyl which

is unsubstituted or substituted once or many times, whereby the substituents may each be independent of one another and are selected from the group consisting of halogen, cyano, C_1-C_2-alkyl, halo-C_1-C_2-alkyl, C_1-C_2-alkoxy and halo-C_1-C_2-alkoxy;

R_8 and R_9, independently of one another, signify hydrogen or C_1-C_2-alkyl;

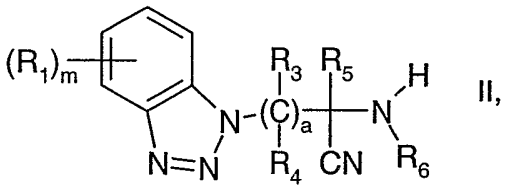
Y signifies C(O);

a signifies 1; and

m is 1 or 2.

27. A compound of formula I according to claim 1 by name N-[1-cyano-1-methyl-2-(5-chlorobenzotriazol-1-yl)-ethyl]-4-trifluoromethoxybenzamide.

28. Process for the preparation of compounds of formula I, respectively in free form or in salt form, according to claim 1, whereby a compound of formula



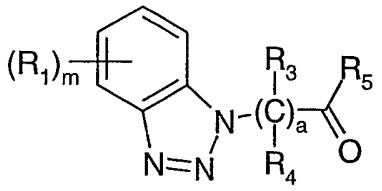
II,

which is known or may be produced analogously to corresponding known compounds, and wherein R_1, R_3, R_4, R_5, R_6, a and m are defined as given for formula I, is reacted with a compound of formula

$$Q—Y—R_7 \quad \text{III},$$

which is known or may be prepared analogously to corresponding known compounds, and wherein Y and R_7 are defined as given for formula I and Q is a leaving group, optionally in the presence of a basic catalyst, and if desired, a compound of formula I obtainable according to the method or in another way, respectively in free form or in salt form, is converted into another compound of formula I, a mixture of isomers obtainable according to the method is separated and the desired isomer isolated and/or a free compound of formula I obtainable according to the method is converted into a salt or a salt of a compound of formula I obtainable according to the method is converted into the free compound of formula I or into another salt.

29. Process for the preparation of compounds of formula II, respectively in free form or in salt form, according to claim 28, whereby a compound of formula



IV,

which is known or may be produced analogously to corresponding known compounds, in which R_1, R_3, R_4, R_5, a and m are defined as for formula I, is reacted with an inorganic or organic cyanide and a compound of formula R_6-NH_2, which is known or may be produced analogously to corresponding known compounds and wherein R_6 is defined as for formula I, and if desired, a compound of formula II obtainable according to the method or in another way, respectively in free form or in salt form, is converted into another compound of formula II, a mixture of isomers obtainable according to the method is separated and the desired isomer isolated and/or a free compound of formula II obtainable according to the method is converted into a salt or a salt of a compound of formula II obtainable according to the method is converted into the free compound of formula II or into another salt.

30. Use of compounds of formula I according to any one of claims 1 to 27 in the control of parasites.

31. Method of controlling parasites, whereby an effective amount of at least one compound of formula I according to any one of claims 1 to 27 is used on the parasites.

32. Use of a compound of formula I according to any one of claims 1 to 27 in a process for controlling parasites on warm-blooded animals.

33. Use of a compound of formula I according to any one of claims 1 to 27 in the preparation of a pharmaceutical composition against parasites on warm-blooded animals.

INTERNATIONAL SEARCH REPORT

International Application No
PCT/EP 03/10047

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 C07D249/18 A61K31/4192 A01N43/707 A61P33/00 A01N37/34

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 C07D A61K A01N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
CHEM ABS Data, EPO-Internal, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 02 49641 A (NOVARTIS ERFIND VERWALT GMBH ;NOVARTIS AG (CH); BOUVIER JACQUES (C) 27 June 2002 (2002-06-27) claims 1-6	1-32
A	EP 0 953 365 A (KAWASUMI LAB INC) 3 November 1999 (1999-11-03) cited in the application claims 1,4,5; example 152	1-32
A	PATENT ABSTRACTS OF JAPAN vol. 016, no. 358 (C-0970), 4 August 1992 (1992-08-04) -& JP 04 112872 A (NIPPON KAYAKU CO LTD), 14 April 1992 (1992-04-14) compound 14 in Table 1, p.6 abstract	1-32

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[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
9 December 2003	19/12/2003

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Schuemacher, A

INTERNATIONAL SEARCH REPORT

International Application No
PCT/EP 03/10047

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication,where appropriate, of the relevant passages	Relevant to claim No.
Y	WO 00 73290 A (ASSMANN LUTZ ;BAYER AGROCHEM KK (JP); ARAKI YASUO (JP); SAWADA HAR) 7 December 2000 (2000-12-07) claims 1,5; examples 122,127 page 17, line 18 - line 19 page 10, line 1 - line 5	1-32
P,X	WO 03 042184 A (NOVARTIS PHARMA GMBH ;NOVARTIS AG (CH); GOEBEL THOMAS (DE); DUCRAY) 22 May 2003 (2003-05-22)	30-32
Y	claims 1,30-34; example 1	1-29

INTERNATIONAL SEARCH REPORT

International application No.
PCT/EP 03/10047

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. [X] Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

Although claims 30-32 are directed to a method of treatment of the human/animal body, the search has been carried out and based on the alleged effects of the compound/composition.

2. [ ] Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:

3. [ ] Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. [ ] As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.

2. [ ] As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. [ ] As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:

4. [ ] No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

[ ] The additional search fees were accompanied by the applicant's protest.

[ ] No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International Application No
PCT/EP 03/10047

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 0249641 A	27-06-2002	AU 3458802 A	01-07-2002
		CA 2432388 A1	27-06-2002
		WO 0249641 A2	27-06-2002
EP 0953365 A	03-11-1999	JP 11313896 A	16-11-1999
		EP 0953365 A2	03-11-1999
JP 04112872 A	14-04-1992	NONE	
WO 0073290 A	07-12-2000	JP 2000336080 A	05-12-2000
		AU 4923200 A	18-12-2000
		BR 0011029 A	19-02-2002
		CN 1353700 T	12-06-2002
		WO 0073290 A1	07-12-2000
		EP 1185519 A1	13-03-2002
		JP 2003500482 T	07-01-2003
		US 2003013750 A1	16-01-2003
WO 03042184 A	22-05-2003	WO 03042184 A1	22-05-2003