The invention relates to a glue-free insect control product for application by a tape roller. The product comprises a flexible sheet-like substrate (2) in the form of an elongated strip. The flexible sheet-like substrate comprises at least a non-adhesive first side (2a). A coating (3) is applied onto the non-adhesive first side of the flexible substrate. The coating comprises a bait and insecticide formulation.
Insect control product

The present invention relates to a product for controlling insects. More particularly, the invention relates to an insect controlling product comprising a bait and/or an insecticide.

Flytraps are known in which the trap consists of a transparent sheet having two adhesive surfaces. A first adhesive surface is foreseen for adhering to the windowpane and a second adhesive surface on the reverse side of the sheet is provided for trapping flies. Prior to use non-stick paper protects both adhesive surfaces.

For a typical application of this transparent adhesive flytrap, the non-stick paper is removed from the first adhesive surface and the flytrap is then fixed to a windowpane. Once the device has been safely placed on the windowpane, the non-stick paper is removed from the second adhesive surface, exposing the sticky surface for catching flies. In other instances, it may be preferred to remove the non-stick paper from the fly-trapping adhesive first, because it has the stronger sticking properties.

The size of these sheets, and the handling of the substantial adhesive surface area when positioning the device on a windowpane after having exposed the first adhesive surface by removing the non-stick paper make the handling thereof quite cumbersome. While the contact of the first or second adhesive surface with the user's fingers and hands should be reduced, it can almost not be completely avoided. This is a particular shortcoming when additional insecticides are used as agents on the second, fly-catching surface.

In another form of known flytraps a transparent sheet has a first adhesive surface foreseen for adhering to the windowpane. A second insecticide coated surface is provided on the reverse side of the sheet for exposure to flies. Prior to use non-stick paper protects both the adhesive first and the insecticide coated second surfaces.

For a typical application of this transparent adhesive flytrap, the non-stick paper is removed from the first adhesive surface and the flytrap is then fixed to a windowpane.
Once the device has been safely placed on the windowpane, the non-stick paper is removed from the second insecticide coated surface, exposing the insecticide surface to the flies. Moreover, users have been observed to remove the non-stick paper from the fly-trapping adhesive first, which exposes the to direct contact with potentially harmful insecticides.

The size of these sheets, and the handling of the substantial adhesive surface area when positioning the device on a windowpane after having exposed the first adhesive surface by removing the non-stick paper make the handling thereof quite cumbersome. A further drawback of these flytraps is that while the contact of the user's fingers and hands with the first adhesive or second insecticide coated surface should be reduced, it can almost not be completely avoided.

The conventional flytraps typically use glue in order to impart the adhesiveness required to make the flytrap adhere to a target surface, such as a windowpane. Such glues, however, are permanently sticky at room temperature and, due to their stickiness, often leave traces on the target surface that are difficult, if not almost impossible, to remove from that surface, particularly after having been in contact for a long time.

It is therefore an object of the present invention, to provide a device for controlling insects, which overcomes the above disadvantages.

According to a first aspect of the present invention, an insect control product for application by a tape roller comprises a flexible sheet-like substrate in the form of an elongated strip. The flexible sheet-like substrate comprises at least a non-adhesive first side. A glue-free coating is applied onto the non-adhesive first side of the flexible substrate. The coating comprises bait and insecticide. Upon contact with a surface of an object the coating adheres thereto and separates from the non-adhesive first side of the substrate.

The bait and insecticide coating may comprise:

- at least one sweetener;
at least one thickening agent;  
at least one solvent; and  
at least one insecticide agent.

5 The at least one solvent may be water.

Advantageously, the solvent content in the bait and insecticide coating may be in excess of 1 percent by weight.

10 Preferably, the solvent content in the bait and insecticide coating may be between 2 and 60 percent by weight.

Even more preferably the solvent content in the bait and insecticide coating may be between 4 and 35 percent by weight.

15 The concentration of the at least one thickening agent in the bait and insecticide coating may be about 20 to 60 percent by weight.

Advantageously, the concentration of the at least one thickening agent in the bait and insecticide coating may be between 30 to 50 percent by weight.

20 Preferably, the least one thickening agent may be water-soluble.

The least one thickening agent may be selected from the group comprising polymeric carbohydrates, coagulants, siliceous polymers, or water-soluble polymers.

25 The concentration of the at least one sweetener in the bait and insecticide coating may be between 15 to 50 percent by weight.

30 Advantageously, the at least one sweetener in the bait and insecticide coating may be between 15 to 40 percent by weight.
Preferably the at least one sweetener may be water-soluble.

The at least one sweetener may be selected from the group comprising sugars such as saccharine, fructose, lactose, syrups such as invert sugar syrups, honey and molasses, or polyalcohols such as sorbitol or glycerine.

The concentration of the at least one insecticide agent in the bait and insecticide coating may be between 1 to 20 percent by weight.

Advantageously the total agent concentration in the bait and insecticide coating may be between 2 to 10 percent by weight.

The at least one agent may be selected from the group comprising pyrethroids such as Imiprothrin and/or Cyphenothrin; organophosphates such as Azamethiphos, neonicotinoides such as Clothianidin; Phenylpyrazole such as Fipronil, Avarmetins, Oxadiazines, Spinosyns.

The product may further comprise separation means such that the first coating adheres stronger to the first side of the substrate and adheres less to a second side of the substrate.

The bait formulation may comprise pheromones. The pheromones may be specific for the targeted species of insects, such as e.g. flies or moths, or crawling insects, such as e.g. ants, cockroaches or silverfish.

The bait formulation may be particularly attractive for the insects aimed, and may further comprise an insecticide agent suitable for killing the insects aimed at, e.g. azamethiphos, imidacloprid, acetamiprid, propoxur, combinations of different pyrethroids or other agents.

The product may further comprise an adhesive layer in direct contact with the bait and insecticide coating.
The thickness of the adhesive layer may be smaller than half the thickness of the coating.

The adhesive layer may be applied on the side of the coating facing towards the substrate.

The adhesive layer may be applied on the side of the coating facing away from the substrate.

According to a second aspect, an applicator device comprises the insect control product according to the present invention, and further comprises at least one coil for storing the wound-up product prior to use.

Advantageously the applicator device may be a single use device or a refill cartridge for a reusable device.

According to a third aspect of the present invention, an insect control product comprises a flexible sheet-like substrate. A first coating is applied on a first side of the flexible substrate. The first coating further comprises a bait formulation and/or an insecticide formulation. The flexible substrate is in the form of an elongated strip.

In a first configuration of the above aspect, the first coating may comprise a glue adapted for trapping insects.

In a further configuration, the glue may be selected strong enough to maintain the trapped insects stuck until they die.

A third configuration of the first aspect may comprise a removable non-stick strip on the first coating.

In another configuration the second side of the flexible substrate may be adhesive.
In a further configuration, the second coating may comprise a non-permanent or removable glue.

In yet another configuration of the first aspect, the second side of the substrate may provide a static adhesion surface.

According to a further configuration, a static adhesion coating may be provided on the second side of the substrate.

In yet another configuration of the first aspect, the first side of the flexible substrate is non-adhesive, whereas the first coating is adhesive. The first coating is applied onto the non-adhesive first side of the flexible substrate, such that upon contact with a substantially smooth surface of an object the first coating adheres thereto and separates from the non-adhesive first side of the substrate.

Another configuration may comprise separation means such that the first coating adheres stronger to the first side of the substrate and adheres less to the second side.

In a further configuration the bait formulation may comprise pheromones. Alternatively, if provided, the glue may comprise pheromones.

In yet another configuration the pheromones may be specific for the targeted species of insects, such as e.g. flies or moths, or crawling insects, such as e.g. cockroaches or silverfish.

In a configuration of the first aspect the bait formulation may be particularly attractive for the targeted insects. It may further comprise an agent suitable for killing the insects aimed at, e.g. azamethiphos, imidacloprid, acetamiprid, propoxur, combinations of different pyrethroids or other agents.
According to a fourth aspect of the present invention, an applicator device comprises the product according to the first aspect of the invention, and further comprises at least one coil for storing the wound-up product prior to use.

According to a configuration of the second aspect, the applicator device may be a single use device or a refill cartridge for a reusable device.

The insect control product according to the present invention may be used in existing tape rollers, such as correction tape rollers or adhesive tape rollers. This may facilitate simple and safe application of the product. Moreover, the present invention may reduce the risk of a user's direct contact with the insecticide. Additionally, it may enable existing tape roller housings to be used for a new field of application, i.e. insect control.

These and other aspects of the invention will now be further described, by way of example only, with reference to the accompanying figures in which

Fig. 1 shows a cross section of an insect control product according to the present invention;

Fig. 2 illustrates a cross section of a first embodiment of an insect control product according to the present invention;

Fig. 2A illustrates a cross section of an alternative of the first embodiment of an insect control product according to the present invention;

Fig. 3 depicts a cross section of a second embodiment of an insect control product according to the present invention;

Fig. 4a shows a cross section of an applicator device for an insect control product according to a first embodiment of the present invention.
Fig. 4b shows a cross section of an applicator device for an insect control product according to a second embodiment of the present invention.

Fig. 5 shows a diagram illustrating the total mortality of a mixed population of houseflies (*musca domestica*) in a test room for one embodiment of the invention.

A general representation of a cross section of an insect control product in accordance with the present invention is shown in Fig. 1. The insect control product 1 comprises a flexible, sheet-like substrate 2 with two sides 2a, 2b. A first coating 3 is applied on the first side 2a of the flexible substrate. The first coating 3 comprises a bait and/or an insecticide, but may not necessarily need to comprise a glue. The flexible substrate 2 on which the first coating 3 is provided, and thus the entire insect control product 1, is in the form of an elongated strip.

It is advantageous that the elongated strip can be wound onto a coil, not shown in Fig. 1, for storing the product 1 prior to use, which facilitates handling of the product 1 during its application. The product 1 wound on a coil may thus be easily applied to substantially smooth surface of an object, such as windowpanes, not shown in Fig. 1. The coil safely stores unused product and protects it from the environment. At the same time, the product 1 may easily be applied simply by rolling and pressing the strip onto the target surface.

Moreover, it may be preferred that the first coating 3 further comprises an adhesive or glue adapted for trapping insects.

These embodiments will now be described in more detail.

Fig. 2 illustrates a cross section of a first embodiment of an insect control product 1 according to the present invention. The product 1 is based on a single insect control coating. This coating 3 originally provided on substrate 2 is transferred from the first surface 2a of the substrate 2 to the surface 6 of a windowpane, and the substrate 2 is
subsequently removed. The insect controlling coating 3 is thus directly applied on the windowpane and is exposed to the targeted insects.

The first coating 3 comprises a bait and/or an insecticide. Examples of suitable bait or insecticide are given below.

Advantageously, at least the first side 2a, but preferably also the second side 2b, of the flexible substrate 2 are provided with a non-stick surface. Either the substrate 2 itself may be produced from non-stick material, such as e.g. silicon paper, or a non-stick coating may have been applied to at least the first side 2a of the substrate 2.

It may be advantageous to select the non-stick properties of each side of the substrate such that the coating 3 adheres stronger to the first side 2a of the substrate 2 it has been applied to, but adheres less to the other, second side 2b of the substrate 2. The difference in adherence on both sides of the substrate 2 enables the product strip windings to separate the top surface of coating 3 from the underside 2b of the substrate 2 when rolling the product 1 off a coil for application.

For producing the insect control product 1, the coating 3 is applied onto the non-stick coating on the first side 2a of the flexible substrate 2, such that upon contact with a substantially smooth surface 6 of an object, the first coating 3 lifts off from substrate 2 and is easily transferred to the surface 6 of the object, to which it adheres as a film.

If the second side 2b of the substrate 2 does not have non-stick properties, it is advantageous to apply a non-stick strip (not shown in Fig. 2) on top of first coating 3, protecting it from contact with other layers of the product 1 when rolled up into a coil.

In an advantageous embodiment shown in Figure 2, the coating 3 may comprise a bait and insecticide formulation, but does not comprise any additional adhesive or glue. With the insect controlling coating 3 directly applied on the surface 6 of a windowpane, the bait and insecticide formulation is thus directly on the pane and may be eaten off by
the insects or is eventually washed off by the user with the next window cleaning. Without adhesive or glue, the insects will not necessarily stick to the surface 6 of the object until they die. The bait and insecticide formulation is advantageously selected such that it adheres by itself to the target surface, such as a windowpane. Insects consume the bait and insecticide formulation and are subsequently killed. The bait formulation/insecticide formulation directly applied to the pane 6 may either be eaten off by the insects, or may be washed off by the user with the next window cleaning without leaving traces of bait or of glue.

In one embodiment the insect control product 1 comprises a flexible sheet-like substrate 2 in which a first coating 3 is applied on a first side 2a of the flexible substrate 2. The first coating 3 comprises a bait formulation and/or an insecticide formulation. The flexible substrate 2 is in the form of an elongated strip.

Advantageously a coating 3 comprising the bait formulation is directly provided on a flexible sheet-like substrate 2. Preferably the flexible substrate 2 is provided in the form of an elongated strip. An applicator device 10 comprises the product and further comprises at least one coil for storing the wound-up product 1 prior to use, as illustrated in Figure 4a. This prevents contact with the skin of the user when applying the product 1. The applicator device 10 may be a single use device or a refill cartridge for a reusable device. The particular function of the applicator device enables the bait coating 3 to be separated from the substrate when applying it to a target surface. Hence the bait coating 3 needs to fulfil certain criteria.

For the envisaged use in a tape-roller applicator, several considerations need to be made. On the one hand side, the bait coating 3 needs to adhere to the first side 2a of the flexible substrate 2 during the wind-up and roll-off phase. On the other hand side the bait coating 3 needs to separate readily from the substrate 2. Then again, it needs to adhere by itself to the target surface 6. Finally, it is a further advantage if, after the end of its useful life, the bait coating 3 can easily be removed from the target surface 6, without leaving traces.
The application in a tape roller requires the bait formulation to exhibit a pseudo-elastic and flexible behaviour. This is necessary for the winding up of the bait coating 3 as well as for its homogenous and continuous application to the target surface.

The bait formulation should not become brittle or crumbly during the product life time and should, of course, be attractive to the targeted insects, e.g. flies.

A suitable bait coating 3 comprises at least one sweetener, at least one thickening agent, at least one solvent, and at least one insecticide agent. A sweetener is a food additive which adds the basic taste of sweetness to a composition and is therefore attractive to insects, such as flies. The term comprises both artificial sweeteners and natural sweeteners, or sugars and sugar substitutes. Thickening agents, or thickeners, are substances which, when added to an aqueous mixture, increase its viscosity without substantially modifying its other properties, such as taste. They provide body, increase stability, and improve suspension of added ingredients.

Appropriate characteristics for a bait coating 3 that can be used in a tape roller application can be obtained by controlling the ratio of sweeteners to thickening agents in the bait composition.

Further characteristics are the hygroscopic properties. Sweeteners are known to be hygroscopic. If the ratio of hygroscopic sweeteners prevails, the water content may become so high that the consistency of the bait paste changes and a useful application is no longer possible. When the ratio of sweeteners is too high, they draw too much water from the environment and, consequently, they tend to dissolve. However, if the ratio of hygroscopic sweeteners is too low, the adhesion of the bait coating to the target surface is no longer possible.

A concentration of between 15 to 60 % by weight of sweeteners in the bait paste has proved suitable. Preferably the concentration of sweeteners is between 25 to 55 % by weight. Preferred sweeteners are carbohydrates such as monosaccharides, disaccharides. Sugars such as saccharine, fructose or lactose, syrups such as invert sugar syrups, honey
or molasses, or polyalcohols such as sorbitol or glycerine may advantageously be used as sweeteners. These carbohydrates possess hygroscopic properties that determine the consistency of the bait composition. It is possible to use either one or several sweeteners. It is further preferred that the at least one sweetener be water-soluble.

The addition of thickening agents not only allows to control the adhesiveness, but furthermore builds a matrix which prepares a homogenous mass enabling a continuous application. Polymeric carbohydrates are preferred thickening agents. Cereals such as wheat flour, or rice bran, or starchy substances such as amylopectin or potato flakes may be used as thickening agents. Moreover, coagulants such as proteins, e.g. albumin, albumen (egg white), albuminous substances such as milk powder, siliceous polymers such as silicates or silica, or polymers such as water-soluble polyacrylate, polyurethane or polyester, may also be used as thickening agents. It is possible to use either one or several thickening agents. It is further preferred that the at least one thickening agent be water-soluble. The preferred concentration of thickening agents has been identified in an elaborate series of experiments and is about 20 to 60 % by weight in the bait. More preferably the concentration of consistency determining thickening agents in the bait and insecticide coating 3 is between 30 to 50 % by weight.

In preparation of the fresh bait paste, it is of advantage to use a solvent. A preferred solvent is water. By means of changing the water content, the viscosity of the fresh bait paste may be suitably determined for the manufacturing process. Once the bait and insecticide coating 3 has been applied on the substrate 2, it is preferred to reduce the solvent content in the product by drying. The evaporation of the solvent, such as water, then leads to the desired viscosity of the product. A residual concentration of 2 to 60 % by weight of water in the bait and insecticide, once dried, has proved suitable. It is particularly advantageous if the water content on the dried bait paste is between 4 to 35 % by weight.

It is further preferred to add at least one insecticide agent with a total agent concentration of 1 to 20 % by weight in the bait and insecticide coating 3. More preferably the at least one insecticide agent has a total agent concentration of 2 to 10 %
by weight in the bait and insecticide coating. The insecticide agent(s) may be selected from the group comprising pyrethroids (preferably Imiprothrin™ and/or Cyphenothrin™), organophosphate (such as Azamethiphos™), neonicotinoides (preferably Clothianidin™), Phenylpyrazole (Fipronil™), Avarmetins™, Oxadiazines™, Spinosyns™.

Example 1:

A fly bait and insecticide coating was prepared with the following composition:

<table>
<thead>
<tr>
<th>Ingredients:</th>
<th>% by weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Molasses</td>
<td>5.5</td>
</tr>
<tr>
<td>Forest honey</td>
<td>23</td>
</tr>
<tr>
<td>granulated sugar</td>
<td>5.5</td>
</tr>
<tr>
<td>bittern</td>
<td>0.11</td>
</tr>
<tr>
<td>defoamer</td>
<td>0.25</td>
</tr>
<tr>
<td>preservative</td>
<td>0.83</td>
</tr>
<tr>
<td>emulsifier</td>
<td>0.6</td>
</tr>
<tr>
<td>Water</td>
<td>30.37</td>
</tr>
<tr>
<td>milk powder</td>
<td>15</td>
</tr>
<tr>
<td>silicate</td>
<td>15.34</td>
</tr>
<tr>
<td>agent</td>
<td>3</td>
</tr>
<tr>
<td>total</td>
<td>100</td>
</tr>
</tbody>
</table>

Efficiency of the fly bait composition according to Example 1:

A specimen bait and insecticide coating strip of width 8 mm, length 400 mm, and thickness 0.3 mm was prepared on a non-stick substrate. The strip can be transferred off the substrate and onto a target surface by placing the bait and insecticide coated side onto the target surface and exerting some pressure. In line with the envisaged use, simply pressing onto the substrate side is sufficient to make the bait and insecticide strip
adhere to the target surface stronger than it does to the substrate. The substrate can thus be removed and leaves an intact strip of bait and insecticide on the target.

The efficiency test shows that the proposed composition of the substances has, in addition to the required physical properties, also an attractive effect on flies (*musca domestica*). Figure 5 shows a diagram illustrating the total mortality of a mixed population of houseflies (*musca domestica*) in a test room. Within the first two hours more than half of the fly population in the 30 square metre test room was knocked down.

Of course, for even simpler application to the target surface 6, the product 1 may comprise a combination of both bait and insecticide coating 3, with an additional adhesive or glue layer 4, and the, as shown in Fig. 2A which illustrates a cross section of an alternative of the first embodiment of an insect control product according to the present invention. It is thus further possible to provide the otherwise glue-free bait and insecticide coating 3 on top of a further coating in the form of a thin adhesive layer 4 in order to enhance the sticking properties. This additional adhesive layer 4 exhibits a stronger tackiness than the bait and insecticide coating 3, but at the same time this does not prevent it from being removed completely and without leaving traces. If an adhesive is used for further coating 4, the adhesive is preferably selected from non-permanent high quality adhesive that allows the substrate 2 to be removed from the surface 6 in one go. It may further be preferred that the adhesive used in further coating 4 does not leave traces on surface 6 when removing it together with bait and insecticide coating 3. Preferably, the further coating 4 is water-soluble. A suitable adhesive layer 4 may advantageously have a thickness between about 0.05 and 0.1 mm.

In a second embodiment shown in Figure 3, the coating 3' comprising the bait and/or insecticide formulation is again provided on the first side 2a of the substrate 2'. However, second side 2b of the substrate 2' has adhesive properties, e.g. by applying a further coating 4' comprising an adhesive to the second side 2b of the substrate 2'. For application, the substrate 2' carrying coating 3' is attached to the pane 6' by means of the adhesive coating 4'. The coating 3 comprising the bait and/or insecticide
formulation on the other, first surface 2a of the substrate 2' is thus exposed to the targeted insects.

The first coating 3' on the exposed first side 2a of the substrate may further comprise an adhesive or glue on the free surface to provide a sticking surface for any insects.

Alternatively, the adhesive properties of substrate side 2b, may be achieved by a static adhesion surface. The static adhesion may e.g. be obtained by selecting the substrate 2' from electrostatic material (such as plasticised polyvinylchloride or polyethylene) in which case no further coating 4' may be necessary in order to achieve the static adhesion. It may, however, be preferred to provide a static adhesion coating 4' on the side 2b of the substrate 2'.

A separator strip 5' may cover the free surface of the coating 3', enabling the product to be rolled up in a coil, e.g. in an applicator device. Referring to Fig. 3, a removable non-stick strip 5' is provided on the first coating 3'. The non-stick strip 5' covers and protects the first coating 3' prior to use. When applying the product 1', the non-stick strip 5' is removed, thus exposing the first coating 3'.

The product strip can easily be removed from the surface 6' of the object by pulling off the substrate 2'. The further coating 4' may be a non-permanent or removable glue which allows the entire strip to be removed by lift-off.

Preferably, the flexible substrate 2' will be selected from clear and transparent material, but it is of course possible to choose coloured, or partly or completely opaque material in accordance with the intended placement. For example transparent or partly transparent substrate material may be preferred for placement on windowpanes.

As mentioned above, the coating 3' may comprise an adhesive or glue. Any extremity of an insect, such as a fly, coming into contact with the first coating, will therefore remain stuck. With the insect controlling coating 3' directly applied on the substrate 2', which is fixed to the windowpane, the flies thus stick directly on the substrate 2'.
Preferably, a high-quality adhesive is used, which allows to be removed in one go, including any dead insects. It may be preferred to choose a non-permanent or removable glue which may be washed off the object's surface 6', or may allow to be removed by lifting off the entire strip of the first coating 3' applied to the object, together with any trapped insects.

It may be advantageous to choose a coating 3' comprising a bait formulation, in order to lure the targets insects towards the first coating 3' comprising the adhesive or glue.

Alternatively, the coating 3' may comprise a bait and insecticide formulation, but no additional adhesive or glue. With the insect controlling coating 3' directly applied on the substrate 2', the bait and insecticide formulation is thus directly on the substrate 2' and may be eaten off by the insects. Without adhesive or glue, the insects will not necessarily stick to the substrate 2' until they die. The bait and insecticide formulation is selected such that it adheres by itself to the substrate 2'. Insects consume the bait and insecticide formulation and are subsequently killed.

Of course, for even better results, the coating 3' may comprise a combination of both adhesive or glue, as well as bait and insecticide formulation.

If an adhesive is used for further coating 4', the adhesive is preferably selected from non-permanent high quality adhesive that allows the substrate 2' to be removed from the surface 6' in one go. Alternatively or additionally it may be preferred that the adhesive used in further coating 4' does not leave traces on surface 6 when removing the substrate 2'.

In a further embodiment, it may be preferred that the substrate 2 is integral with the coating 3, onto which the further adhesive coating 4 is applied. Suitable coatings 3 have been described above.
In an embodiment not shown in the Figures, the insect control product according to the present invention may be in the shape of a coil from which a length of the product may be rolled off and applied to an object's surface. The length of applied strip may be separated from the remainder of unused product on the coil by cutting off a predetermined length before application. Alternatively, the strip may be applied to the surface of an object prior to separating it from the remainder of unused product on the coil. Finally, if foreseen, a separator strip protecting the insect control coating is removed, thus exposing the insect control coating to the targeted insects.

As shown in Fig. 4a, an applicator device 10 for the insect control product 1 according to the present invention comprises at least one coil 7 for storing the wound-up product 1 prior to use. In known manner the product 1 is rolled off coil 7 and is pressed onto an object's surface 6 by roll 9. The adhesive first coating 3 adheres to surface 6. Substrate 2, provided with a non-adhesive surface, then separates from first coating 3 and is fed to take-up coil 8.

Fig. 4b shows an applicator device 10' for the insect control product 1 according to the second embodiment of the present invention. Applicator 10 comprises at least one coil 7 for storing the wound-up product 1' prior to use. In known manner the product 1' is rolled off coil 7 and is pressed onto an object's surface 6 by roll 9. When applying product 1', the second coating 4' adheres to surface 6, attaching substrate 2' together with the first coating 3' to the object. While applying product 1' to surface 6, non-stick strip 5' is taken up by take-up coil 8.

The applicator device may be a single-use device or a refill cartridge for a multiple use device.

In case the coating 3 does not comprise a bait formulation, the insecticide formulation may comprise pheromones. If a bait is used in coating 3, the formulation is preferred to be without pheromones.
If pheromones are used, they are advantageously chosen specific for the different species of insects, e.g. flies, moths, etc. They may also be chosen for use against crawling insects, such as e.g. cockroaches or silverfish.

Advantageously, if an adhesive is used in the insect control product according to the present invention, it is chosen strong enough to maintain the trapped insects stuck until they die.

The bait formulation may be particularly attractive for the insects aimed, and may further comprise an agent suitable for killing the insects aimed at, e.g. azamethiphos, imidacloprid, acetamiprid, propoxur, or combinations of different pyrethroids or other agents. This list is non-exclusive.

The insect control product 1 according of the present invention may be provided as a single-use roller or multiple-use roller with refill cartridges, similar to correction tape rollers. Advantageously, the width/length ratio of product 1 is approximately 1:600 or less. It is preferred that the width/length ratio is between approximately 1:690 and 1:4250. More advantageously, the length of the product strip 1 may be of the order of approximately 5, 6, 8.5, 9, 10, 14 or 17.7 metres, with a preferred width selected between about 4.2, 5, 6, 8.4, or 25.4 millimetres. The thickness of the bait and insecticide coating is between 0.051 to 0.3 mm. While these particular width/length combinations enable the insect control product according to the present invention to be used in conjunction with conventional tape rollers and their respective refill cartridges, it is understood that other width/length combinations may be chosen freely for product 1 without changing the underlying principle of the present invention.

The invention provides for application of the insect control product as a roll-off adhesive and/or roll-off bait and/or insecticide formulation.

The application of the coating is facilitated by rolling-off the product from a coil.
The adhesive or bait formulation may be provided on a substrate strip or applied directly to the windowpane.

No doubt many other effective alternatives will occur to the skilled person. It will be understood that the invention is not limited to the described embodiments and encompasses modifications apparent to those skilled in the art lying within the spirit and scope of the claims appended hereto.
CLAIMS

1. A insect control product for application by a tape roller, the product comprising a flexible sheet-like substrate in the form of an elongated strip wherein

   the flexible sheet-like substrate comprises at least a non-adhesive first side; and

   a glue-free coating is applied onto the non-adhesive first side of the flexible substrate;

   wherein the coating comprises bait and insecticide,

   such that upon contact with a surface of an object the coating adheres thereto and separates from the non-adhesive first side of the substrate.

2. The product according to claim 1, wherein the bait and insecticide coating comprises:

   at least one sweetener;

   at least one thickening agent;

   at least one solvent; and

   at least one insecticide agent.

3. The product according to claim 2, wherein the at least one solvent is water.

4. The product according to claim 2 or 3, wherein the solvent content in the bait and insecticide coating is in excess of 1 percent by weight.

5. The product according to claim 4, wherein the solvent content in the bait and insecticide coating is between 2 and 60 percent by weight.

6. The product according to claim 5, wherein the solvent content in the bait and insecticide coating is between 4 and 35 percent by weight.

7. The product according to any one of claims 2 to 6, wherein the concentration of at least one thickening agent in the bait and insecticide coating is about 20 to 60 percent by weight.
8. The product according to claim 7, wherein the concentration of the at least one thickening agent in the bait and insecticide coating is between 30 to 50 percent by weight.

9. The product according to any one of claims 7 to 8, wherein the least one thickening agent is water-soluble.

10. The product according to any one of claims 7 to 9, wherein the least one thickening agent is selected from the group comprising polymeric carbohydrates, coagulants, siliceous polymers, or water-soluble polymers.

11. The product according to any one of claims 2 to 6, wherein the concentration of the at least one sweetener in the bait and insecticide coating is between 15 to 50 percent by weight.

12. The product according to claim 11, wherein the concentration of the at least one sweetener in the bait and insecticide coating is between 15 to 40 percent by weight.

13. The product according to any one of claims 11 to 12, wherein the at least one sweetener is water-soluble.

14. The product according to any one of claims 11 to 13, wherein the at least one sweetener is selected from the group comprising sugars such as saccharine, fructose, lactose, syrups such as invert sugar syrups, honey and molasses, or polyalcohols such as sorbitol or glycerine.

15. The product according to claim 2, wherein the concentration of the at least one insecticide agent in the bait and insecticide coating is between 1 to 20 percent by weight.
16. The product according to claim 2, wherein the total agent concentration in the bait and insecticide coating is 2 to 10 percent by weight.

17. The product according to claim 2, wherein the at least one agent is selected from the group comprising pyrethroids such as Imiprothrin and/or Cyphenothrin; organophosphates such as Azamethiphos, neonictionoides such as Clothianidin; Phenylpyrazole such as Fipronil; Avarmetins; Oxadiazines; Spinosyns.

18. The product according to any one of the preceding claims, further comprising separation means such that the bait and insecticide coating adheres stronger to the first side of the substrate and adheres less to a second side of the substrate.

19. The product according to any one of claims 1 to 18, wherein the bait formulation comprises pheromones.

20. The product according to claim 19, wherein the pheromones are specific for the targeted species of insects, such as e.g. flies or moths, or crawling insects, such as e.g. ants, cockroaches or silverfish.

21. The product according to any one of claims 1 to 20, wherein the bait formulation is particularly attractive for the insects aimed, and further comprises an insecticide agent suitable for killing the insects aimed at, e.g. azamethiphos, imidaclorpid, acetamiprid, propoxur, combinations of different pyrethroids or other agents.

22. The product according to any one of one of the preceding claims, further comprising an adhesive layer in direct contact with the bait and insecticide coating.

23. The product according to claim 22, wherein the thickness of the adhesive layer is smaller than half the thickness of the bait and insecticide coating.

24. The product according to any one of claims 22 or 23, wherein the adhesive layer is applied on the side of the bait and insecticide coating facing towards the substrate.
25. The product according to any one of claims 22 or 23, wherein the adhesive layer is applied on the side of the bait and insecticide coating facing away from the substrate.

26. An applicator device comprising the insect control product according to any one of one of the preceding claims, and further comprising at least one coil for storing the wound-up product prior to use.

27. The applicator device according to claim 26, wherein the applicator device is a single use device or a refill cartridge for a reusable device.
Total mortality of a mixed population of houseflies (Musca Domestica) in the testroom

Fig. 5
INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2009/057392

A. CLASSIFICATION(S) APPLIED FOR
INV. A01M1/20

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

B. RELATED SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
AOIM

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)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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D. Further documents are listed in the continuation of Box C.

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Date of the actual completion of the international search
15 September 2009

Date of mailing of the international search report
25/09/2009

Name and mailing address of the ISA:
European Patent Office, P.B. 5818 Patentlaan 2
NL-2280 HV Rijswijk
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Authorized officer
Moeremans, Benoit
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