APPARATUS FOR ATTRACTING AND DESTROYING INSECTS

BACKGROUND AND SUMMARY OF THE INVENTION

The present invention relates generally to apparatus for attracting and destroying insects, and more particularly to an apparatus which utilizes carbon dioxide, octenol (1-octen-3-ol) and heat in combination to attract insects, including mosquitoes, biting flies and midges.

Devices for attracting and destroying insects are well-known in the art. For example, U.S. Pat. Nos. 2,106,528 to Jones et al., 3,187,458 to Densmore, 3,835,577 to Soulos, 3,894,351 to Iannini, 4,182,069 to DeYoreo, and 4,387,529 to Hedstrom are representative of the available prior art. The patent to Densmore discloses a device which employs a light for attracting insects and a pesticide saturated mesh surrounding the light for killing the insects attempting to reach the light source. The remaining patents to Jones et al., Soulos, Iannini, DeYoreo and Hedstrom disclose various devices which employ an illuminating and/or odor dispensing mechanism for attracting insects, and an electrified screen grid for electrocuting insects attempting to reach the light or pheromone.

Although the electric "bug zapping" devices are popular with consumers, they have certain shortcomings. For example, the devices employing an ultraviolet light source are effective for attracting and destroying beneficial insects but are ineffective for attracting biting insects, such as mosquitoes and flies, that prey on humans and livestock. The prior art devices which utilize pheromones as the odor source to attract specific types of insects are expensive because the pheromone source is continuously active and therefore must constantly be replaced.

One solution to the foregoing problems is provided in U.S. Pat. No. 5,205,064 to Nolen, which is assigned to the present assignee. This patent discloses a device having a pressurized canister charged with carbon dioxide, octenol, or both, or with insect pheromones. The device further has an infrared and/or ultraviolet light source which is surrounded by an electric grid.

In mosquitoes, which prey primarily on humans and livestock, olfactory structures guide the flight of these insects along the carbon dioxide plume of their hosts' respiration. The plume also contains kairomones, a collective term for the chemical components of the respiration and body odor. Even minute concentrations of kairomones and carbon dioxide are powerful long-range attractants. The mosquito can detect these attractants with their olfactory structures up to 90 meters away. Then these insects can visually locate the host at a distance of ten meters. Since their compound eyes cannot resolve small features, they use sensitive thermal receptors to attack the host. More specifically, the receptors guide the insect to its host and locate areas of high blood density near the surface of the skin from a distance of about three meters away.

Insects, such as mosquitoes, locate hosts through a combination of chemicals characteristic of the animal host. When one component of this chemical signature is present without others, its effectiveness as an attractant is greatly diminished. For example, a great amount of carbon dioxide combined with no octenol is ineffective since no animal exhibits these characteristics. The mosquito catch for either CO_2 or octenol alone increases six-fold when the two are combined, and another three-fold increase results from adding the proper infrared signature. The present invention uses a combination of attractants including carbon dioxide, octenol and heat to effectively and economically attract and destroy these insects without the use of pesticides.

Accordingly, among the several objects of the present invention are the provision of an apparatus which is particularly effective in attracting and destroying insects, such as mosquitos; the provision of such an apparatus which is not harmful to the environment; the provision of such an apparatus which simulates the respiration and temperature of a host animal and which can simulate a variety of host animals; the provision of such an apparatus which can attract many species of insects upon varying the insect attracting components of the apparatus; and the provision of such an apparatus which is relatively simple in design, easy to install and economical to operate.

The present invention is directed to an apparatus for attracting and destroying insects comprising a housing, a canister secured to the housing and containing carbon dioxide, and means for discharging the carbon dioxide from the canister and into the housing. The apparatus further comprises a source of octenol provided in the housing and means for introducing and mixing the octenol with the carbon dioxide within the housing. The mixture of carbon dioxide and octenol is released from the housing for attracting insects. A heat source is also provided for further attracting insects, and an electric grid secured to and surrounding the housing destroys the insects upon their contacting the grid.

In one embodiment of the present invention, the introducing and mixing means comprises a solution of octenol in specialty formulated wax-like substance. The density of the wax is formulated to release an amount of gaseous octenol preferred by the targeted insect species through evaporation at ambient temperatures. The octenol mixes with the discharged carbon dioxide in the housing. Octenol emissions in excess of 4 mg per hour are difficult to obtain through evaporation, but are preferred by most pest species. To achieve these emission levels the molecular weight of the wax is adjusted or the surface area of the wax is increased by saturating a porous, sponge-like material with the octenol-wax solution. In another preferred embodiment, the introducing and mixing means comprises a container containing an aqueous octenol solution wherein the container has an opening for releasing gaseous octenol from the container. The introducing and mixing means further comprises a venturi in fluid communication with the opening of the container. The venturi is in fluid communication with the discharged carbon dioxide for mixing the carbon dioxide with the octenol.

Preferably, the heat source comprises a light trap structure secured within the housing and an incandescent bulb disposed within the light trap structure. The light trap structure has a plurality of walls with reflective and non-reflective interior surfaces wherein the non-reflective interior surfaces of the walls absorb heat generated by the bulb. The heat absorbed by the walls creates an irregular heat pattern which represents a living thing. The heat generated from the heat source corresponds to the level of mixed carbon dioxide and octenol for resembling a living thing.

Other objects, features and advantages of the invention shall become apparent as the description thereof proceeds when considered in connection with the accompanying illustrative drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings which illustrate the best mode presently contemplated for carrying out the present invention: