Electrocution

of House Flies in Bug Zappers Releases Bacteria and Viruses

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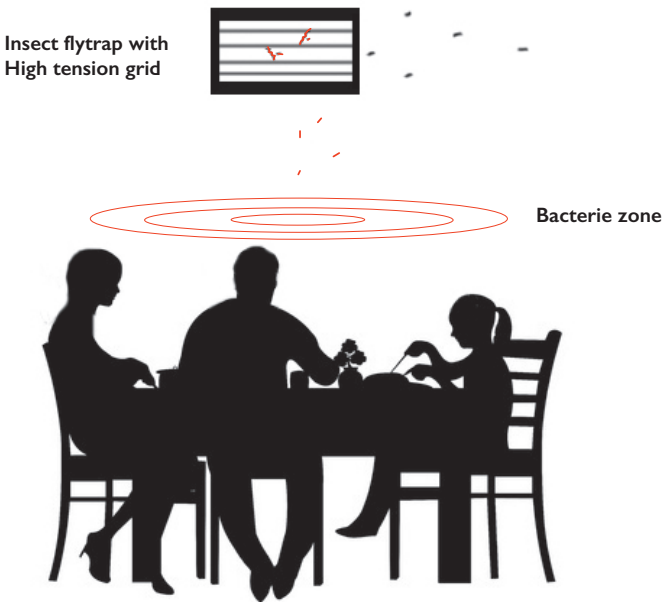
LEADING INNOVATION IN PEST MANAGEMENT

Inside:

More and more markets understand the traditional downsides coming from high tension grid technology and have accepted glue board technology as the accepted standard.

For those markets/clients, who are not fully aware of these dangers, we have placed these dangers below.



Initial costs of the unit
A professional insect control unit, executed with a high tension grid, is more expensive than the same unit, executed with a glue board

Operational costs for a high tension grid
High tension grids are operated by a transformer (or capacitor). These transformers consume easily up to 20 watt per hour, which results in an extra 175kW per unit per year.

At a cost of Euro 0,20 per kWh the annual surcharges would be Euro 35,00 nett.
This is always more expensive than the annual operational costs for an equivalent unit, executed with glue boards.

Unit stability and continuous operation
A high tension grid works by creating an electrical spark between two separated grid elements, which kills the insect who makes contact with both grids. If the transfor mer of the high tension grid breaks down, the grid no longer works and as a result, insects will no longer be killed. The only way to know if the grid is still operational is to test this. Often only after a longer period of time (even up to 1 year) users / technicians find out that the transformer is no longer working.

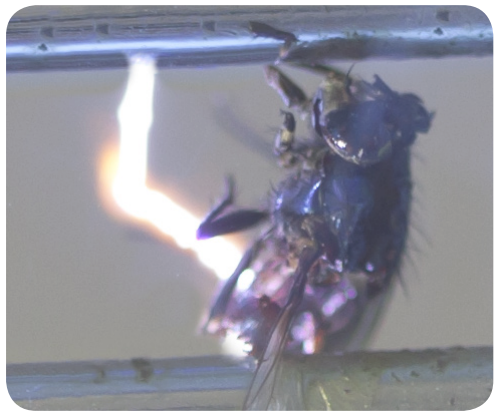
The result is that for a long period of time flies could freely distribute their microbiological load in the area, which should have been safeguarded by the insect control unit.

Health issues
It is well documented that insect particles – and more particular insect hairs – create serious health issues for people with a longue condition (bronchitis – asthma etc.) For this reason these units are banned in those areas in the US were people with health issues commonly can be found (waiting rooms, hospitals, medial areas etc.)

Insect identification
Insects which are electrocuted – and fragmented into smaller insect particles – can no longer be identified on species and or quantities.

Areas with high humidity
In areas with a high humidity or areas were wet cleaning procedures are used, insect control units with a high tension grid will spark more often and could even lead to dangerous situations, especially if the unit is not properly earthed

Areas with dust explosion proof or gas explosion proof
A spark from the high tension grid is absolutely not allowed, as a result this technology cannot be used.



Particle explosion & insect fragmentation
Insect control units with a high tension grid will kill by an electrical discharge, which is so powerful that in the process particles of the insect body (wing, leg, or..) can easily tear off. These insect fragments, will not be collected in the tray, but may eventually find its way into food consumed or food produced in the area, causing decay and sickness.

Small insects
Small flying insects will not make contact with the two grids, especially when the unit is placed in a low humidity area, and will easily fly through the grid without being killed.

Small mammals & fire hazardous situations
Cases are known were birds have been able to fly through a safety grid of units placed in agricultural area and open warehouses, were they were killed by the shock coming from the high tension grid. And in addition to this: The electrocution that took place caused fires and / or fire hazardous situations.

Cleaning of the grid
The grid fouls up fast and needs a thorough periodic cleaning. Preferably this has to be done in an area were the insect particles, which are released from the grid during the cleaning procedure, will not cause any microbiological thread to its environment. This is a more intense and more time consuming procedure.

Safety issues
Service technicians always need to consider the safety factor. Although a possible shock is not life threatening, it certainly is not something one should take light hearted. Up on a ladder, 3 meters in the air – a shock could create a reaction which allows the technician to lose its grip…

Fact sheet Alcochem Hygiene

Source : Electrocution of House Flies in Bug Zappers Releases Bacteria and Viruses
by James E. Urban, Division of Biology*

Date : June 2007

Objective : Many insect exterminators are still executed with a high tension grid. There is still not sufficient awareness in the market of the problems caused by such a unit. The article below describes these threads coming from these units.

Conclusion : To avoid these (microbial) threads it is recommended to use insect control units executed with a glue board instead of a high tension grid in areas were sensitive products such as food, beverage, pharmaceutical or cosmetics are produced, processed or consumed. This is also in accordance with in the HACCP directive.

Electrocution of House Flies in Bug Zappers Releases Bacteria and Viruses

James E. Urban, Division of Biology*

Abstract

Insect electrocutor traps, or "bug zappers", are popular devices which are frequently used by homeowners and food handlers attempting localized control of flying insects including the house fly. The traps contain a visual attractant and a high voltage wire grid.

Upon contact with the grids, the insects are disintegrated by the high voltage. Recent studies show traps to be inefficient in protecting humans from the attack of blood-feeding insects (e.g., mosquitoes). In addition, it is now also known that only an extremely small proportion of the insects killed are pests of crops, humans or animals.

As part of a systematic re-evaluation of electrocution traps and their role in infectious disease spread, we previously reported that during electrocution of house flies (Musca domestica L.), Serratia marcescens bacteria on insect surfaces are readily disseminated for distances up to about 2 meters. House flies which were internally contaminated with S. marcescens liberated three logs fewer bacteria than surface contaminated flies.

Our studies have now been expanded to include assay of the liberation of the Escherichia coli virus Φ X174, a model virus similar in size to human polio virus. House flies were surface contaminated with an aerosol spray of virus or were internally contaminated by feeding a sucrose solution containing virus.

Contaminated flies were placed into a chamber containing an electrocution device. While flies were being electrocuted, liberated virus particles were trapped on the surface of agar plates or via air filtration samplers. Virus presence was indicated by overlaying plates or filters with soft agar solution containing a suitable virus host followed by plaque enumeration. As was observed with bacterial loads, sprayed flies released more virus than fed flies, but proportionally more virus particles than bacteria are released from fed flies. The results of this expanded study provides even more evidence that bug zappers could play a role in infectious disease spread by house flies.

Bug zapper history and facts

Insect light traps have been used extensively since the middle of the last century for research and surveillance in disease prevention, and control of indoor and outdoor insects in homes, and agricultural and industrial operations.

Over the years, the type of light sources has varied from candles and incandescent light bulbs to fluorescent lamps. The most common method for arresting/eliminating insects which are attracted has been the use of electrocuting grids. Grids are energized by 2,500-4,500 V (low current of 8 - 10 mA), and these traps, commonly referred to as bug zappers, produce the characteristic crackling, zapping and sputtering sounds as the insects are killed in the electrocuting grid.

The use of bug zappers around the home environment has been mainly for controlling bloodsucking and annoying insects (Dipterans), especially mosquitoes and gnats, yet it has been shown that these devices are ineffective in reducing local pest insects (Surgeoner & Helson 1977). In fact, it is now known that the probability of being bitten by mosquitoes increases in the vicinity of these traps (Nasci et al. 1983). Recently, it has been demonstrated that the proportion of biting insects killed by bug zappers in home backyards is minute (0.22%), and that at least 13% of the non-target insects killed are insect predators and parasites (Frick & Tallamy 1996).

Production of airborne particles by bug zappers

A major objection to the operation of bug zappers in premises where food is handled is the production of insect parts as insects are disintegrated by the high voltage (Pickens 1989).

Ananth et al. (1992) demonstrated that the operation of electrocuting insect traps in killing house flies significantly increased the number of airborne (respirable) particles; however, they did not identify the source of these particles. Broce (1993) investigated the production of airborne particles from flies and moths being killed by bug zappers by collecting these particles on micro-porous filters.

Filters with the collected particles were then observed under a scanning electron microscope (SEM). Although numerous airborne insect particles, such as hairs and scales, were collected when the insects were released in the test rooms while the traps were off, the number of scale fragments significantly increased when the traps were used.

More recently, Tesch and Goodman (1995) showed that microbes from the naturally occurring fauna of house flies killed by bug zappers can be disseminated in large pieces of insect parts (which settle within 45 min.) and in aerosolised (truly airborne) particles.

Results of our studies and conclusions

Summary of Results

- Flies become more highly contaminated when they feed upon micro organisms than when their surfaces are sprayed with micro organisms.
- Bacteria and viruses are similarly aerosolised by the action of bug zappers and each appears to be spread by bug zappers with equal efficiency.
- When flies are surface contaminated, electrocution typically releases 1 of every 2-4,000 micro organisms.
- Internally contaminated flies release only about 1 of every million bacteria or viruses as a result of electrocution.
- Numerous airborne insect-derived particles are released upon electrocution and these probably serve as vehicles for micro organism transfer.

Conclusions

Our studies show that when Bug Zappers kill insects they stimulate the release of large numbers of bacteria or viruses which may be on the insect surface. Further the zappers produce insect parts such as scales, hairs, and insect body parts. In aggregate, the results show that bug zappers not only pose an immediate threat because of the release of bacteria and viruses, but they also release insect particles which are potential allergens and/ or cause various respiratory conditions such as asthma, rhinitis, and conjunctivitis.

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