FUTURE DIRECTIONS IN URBAN ENTOMOLOGY – DELIVERY SYSTEMS

DAVID H. NAFFZIGER
Whitmire Research Laboratories, Missouri 63122-6620, USA

Delivery systems for the control of public health insects have evolved dramatically over the last thirty years. Once the "poor relation" of agriculture they are now the leading area for innovation. Why this change? Obviously because of the changing environment of where these products are applied; in and around homes, offices, schools, and other commercial buildings.

Modern urban pest control began in the 1960's when insecticides like malathion and diazinon were introduced to replace the chlorinated hydrocarbons. Typical formulations were emulsifiable concentrates and wettable powders. The preferred formulations were emulsifiable concentrates which were easy to develop, manufacture, package and use. Marketing input to the development process consisted of words of encouragement like "keep it competitive".

During the 1960's changes in attitudes began to appear. These changes began to accelerate in the 1970's. Pesticides, insecticides in particular, began to become an evil that was forced on a gullible public that had no protection from unscrupulous companies. This resulted in the formation of the Environmental Protection Agency (EPA) in the United States. "Keep it competitive" suddenly took on a new meaning as rules and perceptions changed.

Delivery systems, formulations and equipment now had to provide low odor, minimum translocation, minimum effects on the environment and maximum efficacy. The costs to develop these systems rose dramatically. The crack and crevice method for applying products was developed and introduced to the market as one way to meet these new requirements. Also chlorpyrifos was introduced as a termiticide and the chlorinated hydrocarbons were removed from the market.

Sometimes the perceptions became more important than the rules. For example odor became associated with toxicity and staining became associated with chemical contamination. Because of their staining potential, wettable powder formulations are now used inside homes only when other formulations cannot be developed. Emulsifiable concentrate formulations are used only with low odor solvents or with a minimum of solvent to reduce odor. Aerosol formulations and micro-encapsulated products have became more popular since they generally exhibit low odor and low translocation potential.

Baits, a delivery system that had not been used for years, began to reappear. Baits offer no odor, no translocation, and no staining potential. They were also generally formulated with active ingredients that were not generally used in public health pest control and had not developed resistance in German cockroaches. Baits were also developed to control Pharaoh's ants which had previously been very difficult, if not impossible, to control.

The challenge for the future is to develop delivery systems for biological control products like nematodes and fungi. In the laboratory many "natural" control systems work very well on urban pests; however, effective methods for using these products in the real world are still evolving.

The development of delivery systems for the urban public health market is probably one of the most exciting areas of research today. The protection of public health will not be abandoned and innovative products and delivery systems will continue to be needed.

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