

THE APPLICATION OF ADVANCED WATER BASED TECHNOLOGY IN THE CONTROL OF PUBLIC HEALTH AND HYGIENE INSECT PESTS

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Abstract—Patented Film Forming Aqueous Spray Technology or 'FFAST' has been used to develop AquaPy®, a water based product containing synergised pyrethrins for use in the control of public health and hygiene pests. This product is highly flexible and can be applied undiluted through Ultra Low Volume (ULV) sprayers, or can be diluted with water for use in mist generators, thermal foggers or compression sprayers for surface applications. One of the major advantages of this formulation over existing pyrethrin containing products is the extremely low mineral hydrocarbon content which makes it ideally suited for use in food handling areas and in commodity stores, such as tobacco bonds.

When applied indoors as a ULV in large scale trials against a wide range of stored product and hygiene insects, the biological performance of this water-based formulation was at least equivalent and often superior to comparable oil based products.

Field trials were also conducted against infestations of *Blattella germanica*. Application of water diluted product as a surface spray gave good flushout and knockdown, and rapidly achieved control, with insect numbers falling by 97% within one day. However, due to the short persistence of pyrethrins cockroach numbers had increased to 33% of pre-treatment levels after 54 days. Control was maintained for over 90 days following re-treatment with AquaPy applied alongside slower acting hydramethylox gel baits. These results demonstrate how this formulation can be used in an integrated approach, making it ideal for use in insecticide sensitive locations.

INTRODUCTION

Insecticidal space spraying offers a convenient, flexible and rapid method for treating large outdoor areas for the control of flying insect pests and vectors of disease such as mosquitoes and houseflies. This method is also used extensively in the indoor control of both flying and crawling insects in situations ranging from small scale domestic applications to large scale industrial premises such as food and commodity storage facilities.

The majority of currently available space spray formulations are oil based. These are either supplied ready to use or can be diluted to the required concentration with further addition of oil, usually as mineral oil or diesel. While these oil based formulations have a long and established history of use, they have many disadvantages, including the risk of flammability during storage and in use, relatively high diluent and transport costs, odour, tainting of foodstuffs and the possibility of damage to exposed paintwork.

The use of water as a diluent largely overcomes these shortfalls. Emulsifiable concentrates (ECs) are oil based formulations that are compatible with water and form relatively stable emulsions that can be sprayed through conventional equipment. However the rapid evaporation of water that occurs from the spray droplets once they are formed often reduces their biological effectiveness, as they are less likely to impact on the target insect.

Extensive laboratory and field trials have been conducted to evaluate the potential of long chain alcohols, when incorporated into water based formulations. These demonstrated that water loss could be reduced with the result that space spray droplets remained within an effective size range. This in turn resulted in a corresponding improvement in biological performance compared with a conventional EC (Groome *et al.*, 1989, Slatter *et al.*, 1993). These successes led to the development of a range of patented water based space spray products primarily designed for outdoor use against houseflies and mosquitoes (European Patent No. 0 331 474). This formulation technology is often referred to by the acronym FFAST, for Film Forming Aqueous Spray Technology.

More recently a pyrethrins based FFAST formulation has been developed, primarily for use indoors, as a space and surface spray. While the evaporation retardation characteristics of this

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