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## A Sorptive Dust for Control of the Northern Fowl Mite, *Ornithonyssus sylviarum*, Infesting Dwellings<sup>1</sup>

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### ABSTRACT

In field evaluation studies Dri-die 67 eliminated the northern fowl mite, *Ornithonyssus sylviarum* (Canestrini and Fanzago), from infested dwellings within 48 hours after being applied to mite-infested birds' nests, furniture, rugs, clothing, patios, attics, subfloor areas, etc. Occupants in treated houses were in no way affected by the compound, even when it was applied to hair and clothing, and 1 application in each of the 4 test dwellings was sufficient to control all the mites. To date, treatment with Dri-Die 67 has kept these dwellings free of all mites, as well as other arthropods.

The northern fowl mite, *Ornithonyssus sylviarum* (Canestrini and Fanzago), occurs throughout the temperate regions of the world as an ectoparasite of domestic fowl and many wild birds. In the absence of bird hosts the mites will sometimes attack man, causing itching both by biting and by crawling over the skin. Such human infestations usually occur when mites invade buildings through windows, vents, or other openings in a building from birds' nests built under eaves or in trees, shrubbery, or other plants or objects located near the openings. Infestations in dwellings generally occur at about the time the nestlings leave their nests, as this is when the mites start migrating. Dwellings become infested also when mite-infested plants or tree boughs are brought inside. Patios, outdoor furniture, bamboo shades, fences, etc. often become infested with mites.

It has been demonstrated that some sorptive dusts can kill various arthropods quite rapidly, by removing, through continuous adsorption, some of the lipid layer that covers the arthropod epicuticle (Ebeling and Wagner 1959; Tarshis 1959, 1960, 1961, 1962, 1963; Tarshis and Blinstrub 1963; Tarshis and Ommert 1961). However, of the more than 150 inert dusts evaluated, SG 67, known commercially as Dri-die<sup>®</sup> 67, is the only one that the writer found both effective enough and practical for use as an insecticide against the 50 species of arthropods it has

been evaluated upon to date. Dri-die 67 is produced by the Davison Chemical Company of Baltimore, Maryland, and is composed of 95.3% silica aerogel and 4.7% ammonium fluosilicate.

Prior to the field studies reported in this paper, the writer had evaluated and found Dri-die 67 to be reasonably effective against a number of species of mites (Tarshis 1960, 1961; Tarshis and Penner 1960). Thus, it seemed likely that Dri-die 67 also would be of value in controlling infestations of the northern fowl mite in houses. This paper is a report on these findings.

**EXPERIMENTAL OBSERVATIONS.—Field Experiments.—**The first field evaluation study utilizing Dri-die 67 for the control of the northern fowl mite was conducted on the large patio of a house. The infestation had apparently originated in several birds' nests built on the tops of large bamboo awnings enclosing the patio. When the birds had abandoned the nests the mites had migrated to the shades, the furniture, and the walls and eaves of the patio. These and the nests were all dusted with Dri-die 67 applied with an Admiral Hudson duster #766 at the dosage rate of 1 lb of dust per 1000 ft<sup>2</sup> of surface area. The nests were destroyed immediately after treatment and were found to be free of live mites at that time. Since no more live mites were found anywhere else after 48 hours the dust was washed off all items and accessible areas with a garden hose. The one treatment with Dri-die 67 was sufficient to control the infestation and there have been no recurrences.

A second similar infestation was encountered in the area surrounding the swimming pool of another house. Heavily mite-infested birds' nests were found on the tops of the aluminum awning supports of the garden house near the pool. The nests, awnings, furniture, walls of the house, and floor were treated with Dri-die 67 applied with the Hudson duster at the same dosage rate as used in the

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preceding field test. Within 48 hours only dead mites could be found, and there has been no reinfestation.

A third field experiment was conducted inside a house which had become infested when the housewife, for aesthetic reasons, had caught the tip of a large frond of a palm tree located in front of her home in a living room window screen. The tree contained a number of recently abandoned birds' nests. The householder's use of several insecticides had failed to control the spread of the mite infestation throughout the house. Several of the children in the home had been bitten by the mites and one 10-year-old had been so badly bitten as to require medical treatment.

Mites were found crawling over the furniture, walls, rugs and floors on the inside of the house and on the stucco walls and wooden fence on the outside. Dri-die 67 was applied with a hand duster at the rate of 1 lb of dust per 1000 ft<sup>2</sup> of surface area to all furniture, as well as to rugs, moldings along floors and ceilings, window frames, etc. The palm frond was removed from the window and the tree was thoroughly dusted from the roof with an electric duster. Dust was applied to the trunk of the tree and to the outside foundation of the house with the Hudson hand duster. There was no attic or subfloor area. Forty-eight hours after treatment the dust was removed from the furnishings with a vacuum cleaner and the occupants have not been bothered further by mites.

The fourth and final field experiment of this series was carried out in a frame house that apparently had become infested when palm fronds were brought in for use as fuel in a fireplace. The occupants complained of severe itching and irritation and required medical attention. However, none of the prescribed dust or spray insecticides had relieved their discomfort.

The house had large attic and subfloor areas and, since these mites will migrate considerable distances, the dust was applied in these areas with an electric duster with a 1- to 1½-gal capacity hopper. The dust was blown into the subfloor area through several foundation vents, all but the vent in use being covered with cardboard while the dust was applied. The attic was dusted through a large gable vent, all other openings in the roof being sealed off during the dusting. One lb of dust per 1000 ft<sup>2</sup> of floor area was again used. A total of approximately 8 oz of Dri-die 67 was applied to mattresses and springs, upholstered furniture, rugs, cupboards, cabinets, floor baseboards and moldings, ceiling moldings, window frames and door frames with a hand duster. The occupants also used some of the dust in their hair and clothing and 3 days following treatment they reported that they were unable to find any live mites and they have not found any since. A 3-day period is somewhat longer than normally required, but the occupants wanted to be sure of complete control. Then the dust in the accessible areas was removed with a vacuum cleaner. It was left in the inaccessible areas.

**DISCUSSION.**—These field evaluation studies corroborated previous findings as to the value of Dri-die 67 for the control of a variety of arthropods of importance to man. It gave complete control of the mite infestations in all 4 tested houses and within 48 hours in at least 3 of the instances, and probably in all 4. None of the occupants of the 4 houses treated with Dri-die 67 was adversely affected by it; even use of the dust in hair and clothing

caused no problem. The compound also left fabrics, building materials, painted surfaces and various types of synthetic finishes unharmed.

Because of the compound's strong positive electrical charge it adheres extremely well to every kind of surface normally encountered, which is one important reason for its superiority to many similar materials. This complete coating of surfaces by a material known to be effective and to remain effective for an almost unlimited time against such annoying household pests as silverfish, ants, cockroaches, saw toothed grain beetles, fowl mites, etc., provides an added bonus when an establishment is treated with it for any problem. The houses treated during these studies have remained virtually free of all arthropods since treatment, as have others treated for various arthropod infestations as long ago as 4½ years. The compound is simple to apply, and easy to remove. Insofar as can be anticipated, it is not likely to become ineffective because of future development of arthropod resistance, since its action is basically physical rather than chemical. Since this material has an extremely low mammalian toxicity (the acute oral and dermal LD<sub>50</sub> for laboratory animals in excess of 3160 mg/kg of body weight) it can be considered one of the safest insecticides available for use in houses and other places frequented by people or animals.

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