UPDATE NOTE CONCERNING HORTICULTURAL OIL CONCENTRATIONS FOR VERDANT USE

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Abstract. Previous work has provided evidence that verdant use of 3% horticultural oil is a highly effective means of controlling a wide range of arthropod pests. Results given here indicate that in most cases equally good control may be obtained using Sunspray 6E oil at the 2% level.

Résumé. Certaines études ont prouvé que l'utilisation de l'huile dormante à une concentration de 3% est un moyen très efficace pour contrôler plusieurs arthropodes. Les résultats présents indiquent que dans la plupart des cas, un contrôle aussi bon est possible en utilisant l'huile Sunspray 6E à une concentration de 2%.

Our investigations into the plant safety and insecticide efficacy of horticultural spray oil during the spring and summer of 1987 (1) placed considerable emphasis on evaluating the risk of foliar phytotoxicity for Sun Refining Company's product, Sunspray 6E. In an effort to increase the possibility of plant damage in a manner that might well be encountered as a result of user error, we choose the 3% oil concentration suggested for *dormant* use on fully leafed out plants. The current product label specifies a 2% dilution for verdant use, as does the most recent *Cornell Recommendations* (2). Phytotoxicity to a wide range of woody ornamental plants at this higher concentration was found to be limited to certain nut tree species while efficacy against several common arthropod pests was good to excellent. In an effort to avoid confusion concerning seasonally recommended spray oil concentrations, representative portions of the 1987 field work were redone at the 2% rate. The pesticidal efficacy of Sunspray 6E at this reduced rate of application was compared to results at the higher concentration and found to be essentially unchanged. Unusually high foliage and pest density may justify dosage greater than 2%. To obtain the desired control, sprayer operators must understand the properties of horticultural oil and spray accordingly.

Materials and Methods

Within the constraints of naturally occurring pest populations and a highly abnormal year seasonally, methodology and materials were kept as close to the original trials as was possible, often to the point of utilizing portions of the same plants used previously. A complete description of the application and evaluation techniques we employed may be found by consulting our cited paper (1).

Results and Discussion

Four species of aphids considered representative of the 15 species evaluated previously were selected for treatment at the 2% oil concentration: bean aphid *(Aphis fabae)* on a species of tree euonymus *(Euonymus europaea),* an oak aphid *(Myzocallis granovski)* on red oak *(Quercus rubra),* tuliptree aphid *(Macrosiphum liriodendri)* on tuliptree *(Liriodendron tulipifera),* and spirea aphid *(Aphis citricola)* on bridal wreath *(Spirea prunifolia).* Populations were heavy, often solidly encasing a portion of a stem or appearing as a dense, discrete mass of several dozen to a hundred individuals on a leaf surface. Adults and the several immature instars were often present at the same time. Following treatment with 2% oil spray, no individuals remained alive after 24 hours had passed.

Three mite species, a pair of spider mites and a rust (eriophyid) mite, were evaluated for sensitivity to the lower concentration oil treatment: spruce spider mite *(Oligonychus ununguis)* on northern hemlock *(Tsuga canadensis),* linden spider mite *(Eotetranychus tiliarum)* on silver leaf linden *(Tilia tomentosa)* and privet rust mite *(Aculus ligustri)* on privet *(Ligustrum obtusifolium).* Although populations were slightly lower than have been seen in previous years, results followed a nearly identical pattern. Within 1 day after a 2% oil spray had been applied, no living individuals could be located. Unhatched eggs became wrinkled and shrunken, and none was found to be viable during the follow-up period of observation.

Of the 6 scale species originally tested, 4 were selected for reevaluation at the lowered oil concentration: juniper scale *(Carulaspis juniperi)* on American arborvitae *(Thuja occidentalis),*

euonymus scale *(Unapsis euonymi)* on euonymus *(Euonymus europaea),* European elm scale *(Gossyparia spuria)* on American elm *(Ulmus americana),* and pine needle scale *(Chionaspis pinifoliae)* on red pine *(Pinus resinosa).* As in earlier work, these trials of 2% oil were divided into two aspects, the product's ovicidal potential and its subsequent efficacy against both crawlers and settled crawlers. Preemergence treatment of some very heavy scale infestations suggests that, although a major reduction in egg hatch of perhaps 75% can be obtained, ovicidal action is slightly less than at the higher 3% concentration. There is also some suggestion that the degree of control obtained via ovicidal action may be related to timing of the application, being more effective when embryos have fully developed and start to hatch, weakening seal of scale cover (test) to surface of host plant. All crawlers, both active and settled, were apparently killed shortly after being contacted by the oil spray.

Summary

The goal of these selected replication trials was to compare the pesticidal efficacy of 2% oil with results obtained previously using a concentration of 3%. We found that when physically bathed by the spray, the lower concentration was fully as effective as the higher in controlling aphids, mites and scale crawlers. Both concentrations were equally effective against mite eggs with only slight differences in toxicity to scale eggs. Although no indication of foliar phytotoxicity was seen at either dilution, it remains a good rule of thumb to utilize the lowest *effective* dose possible.

Literature Cited

1. Baxendale, R.W. and W.T. Johnson. 1988. *Evaluation of summer oil spray on amenity plants.* J. Arboric. 14:220-225.
2. Cornell recommendations for pest control for commercial production and maintenance of trees and shrubs. Ithaca, NY: Cornell Cooperative Extension. 79 p.

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Errata

We regret that in the layup of one paper in the November issue of the Journal, we inadvertantly transposed two lines of type on two columns. Please make the following corrections in your copy of the Journal of Arboriculture or request a corrected reprint from the authors of the paper.

The first two lines on the second column of page 271 should read:

The delay problems or response irregularities of tree crew injection can be minimized through the

The first two lines on the first column of page 272 should read:

tively reduce the majority of expelled material by simultaneously venting the injection system and