Preliminary Study on the Control of the Cottony-Cushion Scale (*Icerya purchasii* Maskell,) by Means of Insecticides

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INTRODUCTION

Icerya purchasii Maskell, or the cottony-cushion scale, was first officially recorded in Puerto Rico by W. A. Hoffman on trees of beefwood or Australian pine, *Casuarina equisetifolia* Forst at San Juan (*1*).[2] This introduced species, which for a short time appeared to be a serious pest to our agriculture, is practically under natural control. Since its introduction it has spread widely around the Island; fortunately, it has become less destructive because today it is practically controlled by its natural parasites and predators when it becomes abundant. Today, with the advent of modern and effective insecticides, it is controlled very readily.

A more complete historical account of this insect pest is found in an interesting article published by Wolcott and Seín (*2*) in 1933.

DESCRIPTION AND CHARACTERISTICS

THE INSECT AND ITS CONTROL

The general appearance of the insect, however, is strikingly odd owing to waxy excretions from the ventral plate of the adult female. The waxy material constitutes the egg sac. The eggs are laid in the waxy secretion. After the egg sac is fully formed the female may measure about 3/8 of an inch in length. The sac is white and grooved or fluted.

The young scales are reddish-brown and very active, and spread by their own efforts and by the agency of the winds, as well as birds and other insects. Some yellow waxy threads often extend from the body and cause a hairy appearance.

The female insect is, for the most part, reddish-orange in color, more or less spotted with white or lemon (fig. 1).

The winged male is rather large for a coccid and has a reddish body with smoky wings.

NATURAL ENEMIES

The more important natural enemy of the cottony-cushion scale is the introduced Australian ladybeetle, *Rodolia cardinalis* Mulsant. This predator,

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[2] Italic numbers in parentheses refer to Literature Cited p. 299.

plus various native ones and other insect parasites, some of which are the following: the lacewing fly, *Chrysopa collaris* Schneider; the introduced agromyzid fly, *Cryptochaetum iceryae* Williston; the phorid fly, *Syneura cocciphila* Coquillet; the coccinellid beetles, *Decadiomus pictus* Chapin and *Cycloneda sanguinea* L., keep the insect pest at fairly low levels.

FIG. 1.—The cottony-cushion scale, *Icerya purchasii* Maskell, on twigs of australian pine, *Casuarina equisetifolia* Forst.

Spicaria javanica Bally, an entomogenous fungus, has been also recorded as an enemy of this pest.

TYPE OF INJURY

The cottony-cushion scale is a small inactive insect that feeds on the sap of the leaves and twigs of the plants or trees it attacks. Heavily infested plants appear unhealthy and produce very little new growth. The foliage

develops chlorotic areas and may drop prematurely and a portion of the twigs and branches may be killed. The fluted scales exude a great quantity of honeydew, and trees badly attacked by it are covered by sootie-mold and various species of ants.

HOSTS

The following plants and trees are recorded as being infested by this scale insect in Puerto Rico:

Acalypha Wilkesiana Muell. Arg.—"capa de obispo"
Adenoropium multifidum (L.) Pohl—"Don Tomás"
Cajan indicus (L.) Millsp.—"gandures"
Callophyllum antillanum Britton—"María"
Capsicum annuum L.—"pimiento"
Citrus aurantifolia (Christm.) Swingle—"lima"
C. maxima (Burm.) Merril—"toronja"
C. sinensis (L.) Osbeck—"china"
Erythrina glauca Willd.—"bucaré"
Hibiscus rosa-sinensis L.—"amapola"
Isandrina emarginata (L.) Britton & Ross—"vela de muerto"
Pithecellobium dulce (Loxb.) Benth.—"guamá americano"
Polyscias Guilfoylei (E. March) Dcne. & Pl.—"gallego"
Neltuma (Prosopis) juliflora (D.C.) Raf.—"bayahonda"
Malpighia punicifolia L.—"acerola" (new host record)

DISTRIBUTION

Australia is said to be the original home of the fluted-scale, from whence it passed to New Zealand and subsequently into South Africa, Fiji, the Sandwich Island, the West Indies, Continental United States and into many parts of Europe (*3*, *4*).

EXPERIMENTAL MATERIAL AND METHODS OF CONTROL

We cannot depend always or exclusively upon biological control. Sometimes the use of insecticides becomes necessary for a better and more rapid means of control of the insect's outbreaks which occur frequently. With this in mind a control experiment was begun April 25, 1957, in order to evaluate the effectiveness of two insecticides against this insect pest in a sudden outbreak occurring at La Catalina Nurseries, of the U.S. Forest Service, at El Yunque Range. The two insecticides were: Parathion, wettable powder containing 15 percent of the active ingredient per pound, used at the rate of 1½ pounds in 100 gallons of water; and Malathion, wettable powder containing 25 percent of the active ingredient, used at the rate of 2 and 4 pounds in 100 gallons of water.

Experimental control treatments were made on an 80-foot Australian pine seedbed heavily infested with the cottony-cushion scale. The seedbed was divided into 16 plots, 5 × 3 feet. The treatments were replicated four times. The Australian pine trees were from 1 to 2 feet high. All insecticides were applied with a knapsack sprayer.

RESULTS

Results were determined by counting the number of live scales before and after the treatment, found on a total number of pine trees in a square-foot area chosen at random in each plot. After 8 days of the application of insecticides perfect control was found for all adult scales with both insecticides, while the scales in the check continued alive (table 1).

TABLE 1.—*Results on the control of* **Icerya purchasii** *Maskell by means of Parathion and Malathion*

Insecticide	Dilution	Number of live scales[1] in 1 square foot for each treatment		
		Before treatment, Apr. 21, 1957 alive	After treatment, May 3, 1957	
			Dead	Alive
Parathion	1½ lb. in 100 gal. water	208	181	0
Malathion	2 lb. in 100 gal. water	159	155	0
Do.	4 lb. in 100 gal. water	226	222	0
Check	Nontreated	206	0	206

[1] The counts are based on adult scales and crawlers.

It was observed, however, that the insecticides were not effective in the control of the eggs, since many of them were hatching and crawlers were found around. So, for an effective control, one or two additional sprayings at 15-day intervals are necessary to destroy the young as they hatch.

SUMMARY

The cottony-cushion scale, *Icerya purchasii* Maskell, is one of the soft scales that attack a large variety of plants and trees in our Island. A series of host plants are listed and the insect is briefly described. Its distribution and natural enemies are also listed. Two insecticides, namely Parathion and Malathion, were tested for the control of the cottony-cushion scale in Australian pine, *Casuarina equisetifolia* Forst. Total control was obtained for all adult scales and crawlers with both insecticides, while in the checks both stages continued alive. It was found that the insecticides were not effective in the control of the eggs.

RESUMEN

La cochinilla blanca, *Icerya purchasii* Maskell, es una queresa blanda que ataca a una gran variedad de plantas y árboles en Puerto Rico. Se describe el insecto brevemente y se incluye una lista de plantas hospedadoras. También se informa sobre su distribución y sobre sus enemigos naturales. Se probaron los insecticidas Paración y Malación para combatir esta queresa. Se logró un control completo de las formas adultas y jóvenes de la misma, mientras los testigos no tratados permanecieron infestados. Se encontró que los insecticidas mencionados no son eficaces para el control de los huevos de esta queresa.

LITERATURE CITED

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