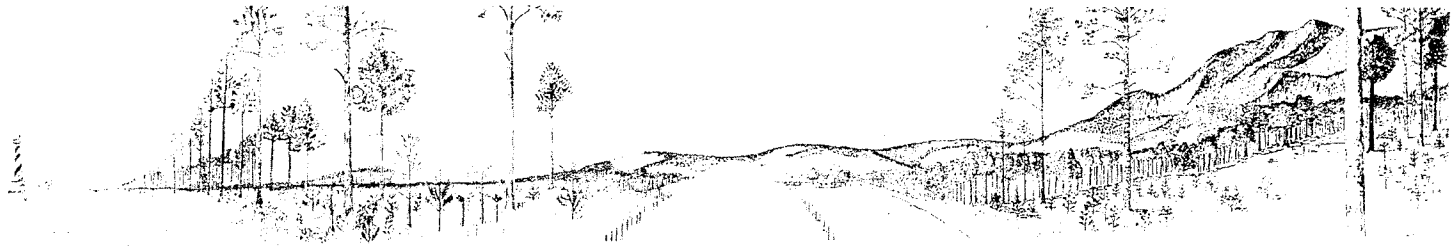

USDA Forest Service Research Note SE-142 November 1970

THE NUMBER OF INSTARS OF DIORYCTRIA AMATELLA (HULST)[1] IN NORTH FLORIDA

Abstract.--Counts of the number of larval molts and analysis of the distribution of head-capsule widths revealed that, in north Florida, Dioryctria amatella (Hulst) has five instars.

Larvae of Dioryctria amatella (Hulst) frequently infest the flowers, cones, shoots and diseased stems of slash pine, Pinus elliottii Engelm., and longleaf pine, Pinus palustris Mill., in north Florida. Although the biology of this species has been described in part for the north Florida area (Ebel 1963, 1965), the number of instars has not been reported. Such information will enable researchers to determine the age of larvae in studies of the biology, ecology, and control of this insect.

METHODS

The number of instars of D. amatella was initially estimated by observing the number of times that 50 larvae molted during laboratory rearings. These larvae were reared on pine cones by the method described by Merkel and Fatzinger (1966). Molting periods were distinguished by observing the cast head capsules throughout the larval stage and the appearance of newly molted larvae (nonfeeding larvae with pale-colored head capsules) in rearing containers.

In addition, a series of different age groups, or instars, of larvae were collected throughout the year by dissecting slash pine cones and branches or stems of slash pine infected with fusiform rust, Cronartium fusiforme (A. & K.) Hedgc. & Hunt. These larvae were killed and preserved by the techniques described by Merkel (1962). The head-capsule widths were measured to the nearest 0.01 mm. with a stereomicroscope equipped with an eyepiece micrometer. Measurements were taken across the widest part of the dorsum of the head capsule.

[1] Lepidoptera: Pyralidae.

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RESULTS AND DISCUSSION

The preliminary observations of cast head capsules indicated that larvae of D. amatella have five instars. This estimate was substantiated by the distribution of head-capsule widths in larvae collected from slash pine (fig. 1). An analysis of this distribution appears in table 1.

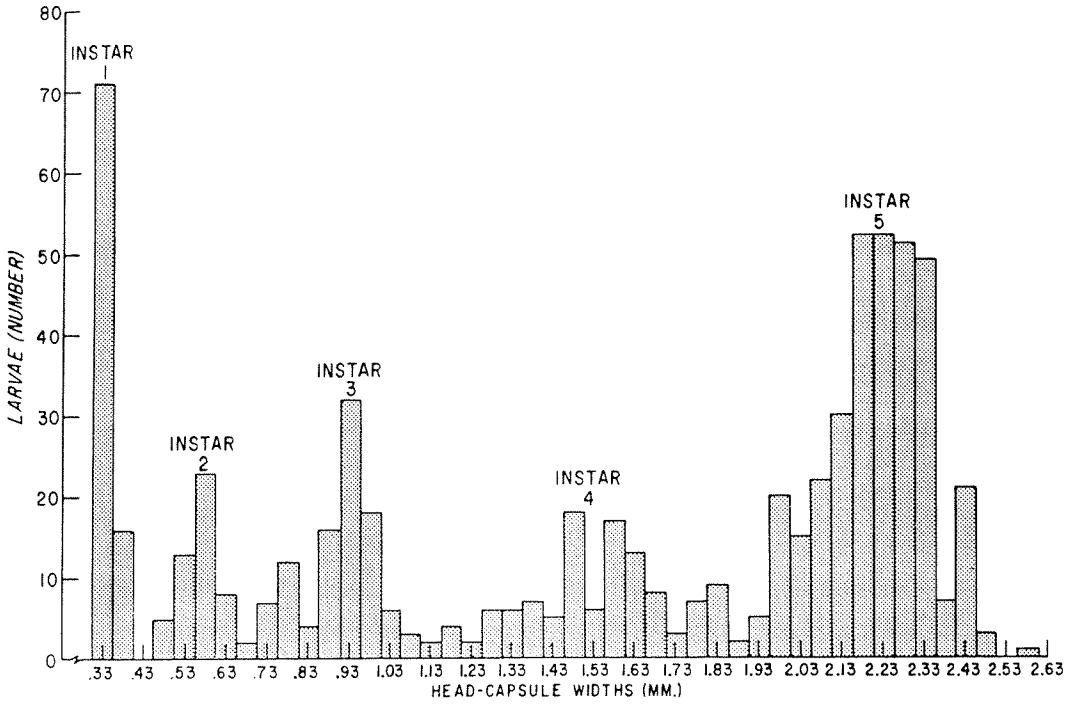

Figure 1.--Distribution of head-capsule widths of the five instars of Dioryctria amatella (Hulst) in north Florida.

Table 1.--Head-capsule widths of the five instars of Dioryctria amatella (Hulst) in north Florida

Instar	Number of larvae measured	Head-capsule widths (mm.):	
		Mean ± SD	Range
1	87	0.34 0.020	0.32 - 0.38
2	51	.57 .050	.41 - .70
3	104	.92 .101	.74 - 1.17
4	109	1.55 .175	1.20 - 1.86
5	328	2.21 .127	1.90 - 2.56

Table 2.--Ratios of head-capsule width for the five instars of Dioryctria amatella and of Dioryctria abietella in north Florida

Instar	Ratios of head-capsule width	
	D. amatella	D. abietella[1]
1	--	--
2	0.60	0.63
3	.62	.62
4	.59	.62
5	.70	.64

[1] Ratios for D. abietella derived from Merkel (1962).

Merkel (1962) found that a closely related species occurring in north Florida, Dioryctria abietella (D. & S.), also has five instars. The theoretically constant ratios of head-capsule width for successive instars (Dyar 1890) of these two species are compared in table 2. The ratios of head-capsule width for larvae of D. abietella were relatively constant, as were the ratios for instars one through four of D. amatella. However, the ratio between the fourth and fifth instars of D. amatella (0.70) diverged from the mean constant ratio of the first four instars (0.60).

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