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**PERSISTENCE OF JACK PINE BUDWORM  
*CHORISTONEURA PINUS PINUS*, (LEPIDOPTERA: TORTRICIDAE)  
EGG MASS CHORIONS ON JACK PINE FOLIAGE**

Harold O. Batzer and Daniel T. Jennings<sup>1</sup>

ABSTRACT

More than one-fifth of old and nearly one-half of new jack pine budworm egg mass chorions remained on the foliage after one year, and an experienced observer could not determine accurately the age of one-fourth of them. Counts of new egg masses are used to estimate current populations, and large errors could result.

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Egg mass counts of jack pine budworm (*Choristoneura pinus pinus* Freeman) are used to estimate population size and potential infestation level for the succeeding year (Graham, 1935; Dixon et al., 1956; Dixon and Benjamin, 1963; Benjamin, 1965; Foltz et al., 1968). Weathering affects appearance of individual egg mass chorions differently so old masses may mistakenly be included in the count if it is not made soon after oviposition or larval eclosion when the chorions are still fresh. Therefore, we obtained some information on persistence of egg mass chorions to try to assess the magnitude of the potential error, egg masses that remain on the needles from previous generations.

In conjunction with a jack pine budworm population study near Baudette, Minnesota, we located 119 egg masses on needles of jack pine (*Pinus banksiana* Lamb.) trees. To ensure a variety of exposure conditions we searched 18 trees from adjoining stands with densities of 7, 14, 21, and 28 m<sup>2</sup>/ha basal area stocking, and examined branches along one side of each tree crown. We made the examination on 9 August, 1966, during larval eclosion when current egg masses were readily distinguishable from egg mass chorions of previous generations. The egg masses were recorded as either old (28) or new (91) and tagged so they could be easily relocated.

After one year, on 4 August, 1967, we relocated the tags and recorded whether the egg mass chorions were absent or present. The twigs containing the egg masses that were still present were removed and the chorions were examined under a microscope. We attempted to classify them as either "new" or "old" based only on their condition: relative degree of flattening, tearing, missing eggs, and presence of debris.

RESULTS AND DISCUSSION

One year later four tags could not be found and 67 egg mass chorions had dropped off. Nearly one-half of the new and more than one-fifth of the old egg masses remained on the needles (Table 1). Even an experienced observer could not make positive age determination for more than one-fourth of these because they were in such good condition. Morris (1955) found 14% of old spruce budworm egg masses to be confused with newly hatched masses.

The magnitude of this error will depend upon factors affecting weathering as well as the number of new egg masses deposited each year. For example, if the number deposited in the current year is equal to the number deposited in the preceding year, and if there is, as observed here, a 42% retention of which 27% remain indistinguishable from current eggs, then the error in establishing the current count is 27% of 42% or 11%. This error would be lower in a rising population and higher in a declining population. It is, of course, not known

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Table 1. Persistence and condition of egg mass chorions on jack pine.

Condition	Chorions present originally (No.)	Chorions present after 1 year		Chorions whose age could not be determined	
		(No.)	(%)	(No.)	(%)
Old	27	6	22	1	17
New	88	42	48	12	29
Total	115	48	42	13	27

how closely these data apply to other years and locations. Nevertheless, overestimates caused by this error may be minimized by making egg mass collections soon after oviposition. The data also point out the need for a method to precisely assess egg mass age.

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