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PARASITISM OF DOUGLAS-FIR TUSsock MoTH EGGS IN DENVER



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PARASITISM OF DOUGLAS-FIR TUSsock MOTH EGGS IN DENVER

by

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Technical Report R2-6  
November 1976

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## INTRODUCTION

Egg parasite surveys were conducted in May 1976 in the Denver area to examine parasitism of Douglas-fir tussock moth (DFTM) eggs, *Orgyia pseudotsugata* McD., on Federal and selected private lands. These surveys were conducted by Bob Averill and Larry Yarger, Entomologists, Forest Insect and Disease Management (FIDM) and Ken Hostetler, Denver District Forester, Colorado State Forest Service.

## METHODS

Egg masses were removed from branches within the lower crowns of spruce (*Picea* spp.) trees defoliated by DFTM in 1975. Egg masses from each of seven locations (Figure 1) were placed in large vials and transported to the FIDM laboratory in Lakewood, Colorado. Each egg mass was placed in a plastic petri dish maintained at room temperature and given 8 hours of room light until emergence was completed. One hundred forty-one new and 3 old egg masses were collected.

Insects which emerged from the egg masses were tentatively identified. Representative specimens were shipped for verification to Dr. Torolf Torgersen, Pacific Northwest, USFS Corvallis, Ore. and to the United States National Museum. Additional specimens have been retained in the FIDM insect collection in Lakewood.

A subsample of 12 egg masses were analyzed to determine the average number of eggs per egg mass. Eggs were separated from the egg mass by gently crumbling the egg mass, placing the broken mass in a beaker containing a 2 percent Clorox solution and agitating with a magnetic stirrer for 10 minutes. The solution was then filtered. The eggs were spread out on filter paper and were counted under a stereomicroscope.

## RESULTS

*Telenomus californicus* Ash. was the only species of egg parasite recovered. Six males of the family Pseudococcidae, probably <sup>1/</sup>*Phenacoccus minimus* Tinsley, were recovered from one old egg mass.

The mean number of eggs per egg mass was  $187 \pm 59.5$ . The mean number of DFTM larvae hatching per egg mass was  $16.2 \pm 20.4$ ; the

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<sup>1/</sup>

Determined by D. R. Miller, USNM





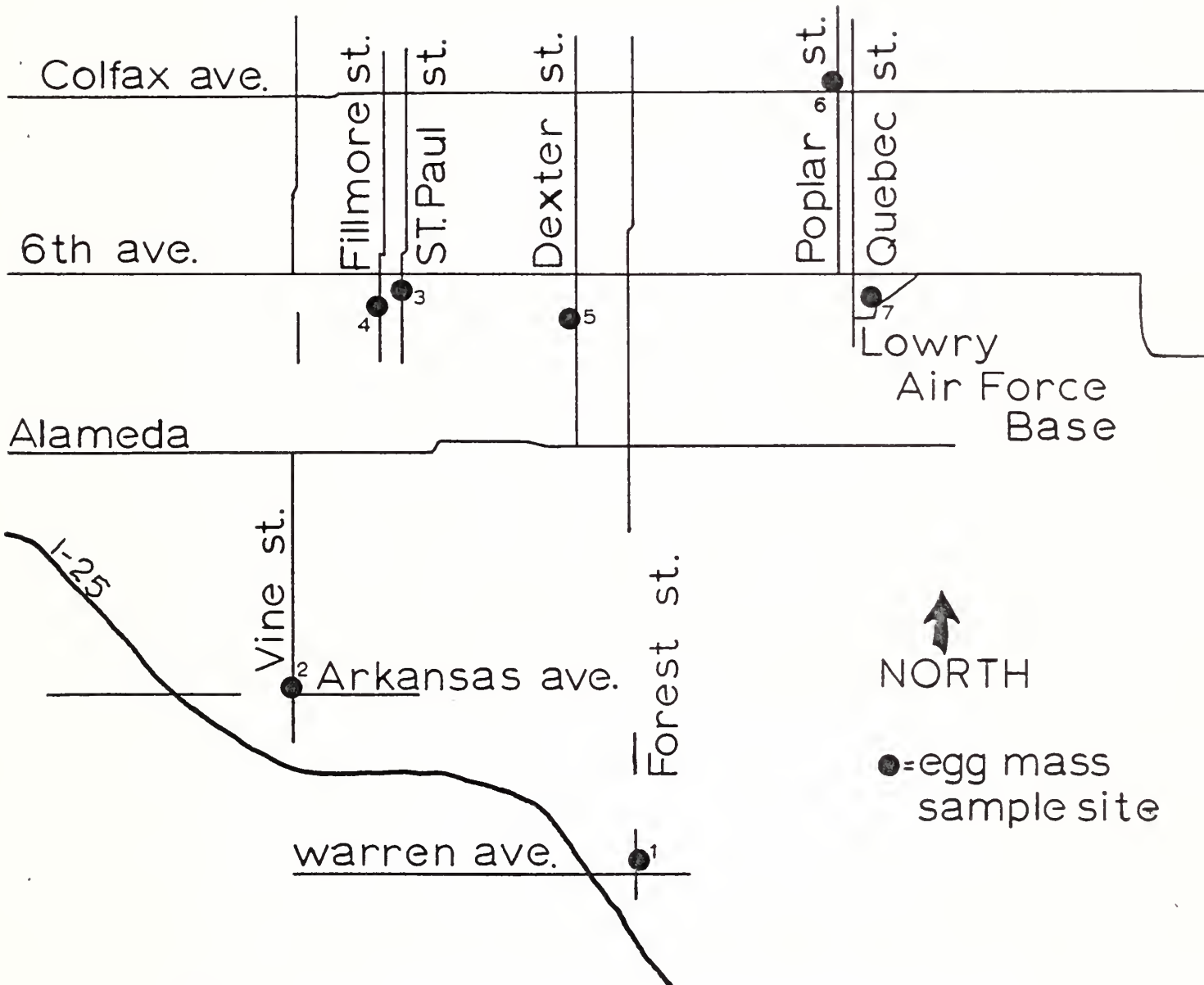


Figure 1. Sample locations for DFTM egg parasitism, Denver, Colorado



mean number of *T. californicus* was  $18.6 \pm 20.4$  per egg mass. Statistics by sample site for larval and parasite emergence are presented in Table 1.

TABLE 1 Larval, parasite emergence and percent parasitism within emerging populations of DFTM in East Denver

Site	Number of egg masses	DFTM larvae		<i>T. californicus</i>		% Parasitism by <i>T. californicus</i>
		$\bar{X}$	SD	$\bar{X}$	SD	
1	19	9.5	14.5	16.8	14.0	64.0
2	8	0.1	0.4	1.1	3.2	90.0
3	13	12.5	21.6	2.6	6.0	17.4
4	19	17.4	24.7	8.7	10.7	35.4
5	6	15.3	17.6	4.0	3.3	20.7
6	6	39.5	24.2	25.5	3.7	39.2
7	70	75.6	49.3	3.0	7.4	3.7

## DISCUSSION

This is the first known attempt to examine parasitism of DFTM eggs in the Denver area. The current outbreak probably started in 1972 or 1973. The insect was a problem in 1973 at Fort Carson, south of Colorado Springs. In 1973 FIDM became aware of an outbreak in the Denver area. Application of pesticides has been the tactic employed to mitigate the DFTM population. However, control has not been achieved in the Denver area and the effects of the population continue to be a concern to landowners.

The data show a wide range of parasitism (3.7 - 90%) in the DFTM population. Habitat differences, including presence of alternate hosts, and improper timing of pesticide application may explain the vast population range. Pesticides applied either before the egg hatch or after adult emergence could be detrimental to the egg parasite populations.



Less than 20 percent of the eggs in the subsample produced viable DFTM larvae or parasites. Whether this low emergence is typical, or an indicator of a collapsing population in the Denver area is unknown. Egg masses were not checked for incidence of a virus, which also could cause the low emergence.

Torgersen (personal communication) indicates that four genera of parasites attack DFTM eggs: *Trichogramma* (Trichogrammatidae); *Tetrastichus* (Eulophidae); *Anastatus* (Eupelmidae) and *Telenomus* (Scelionidae). *Trichogramma* and *Telenomus* are common parasites of DFTM egg masses while *Anastatus* is uncommon. *Tetrastichus* has been common in DFTM egg masses collected in New Mexico. We are uncertain why we recovered only *Telenomus*. Although *Trichogramma* is present in the Denver area it is absent from our collection. The absence may indicate a failure to capture it in the laboratory.

#### RECOMMENDATIONS

The DFTM egg mass sampling should be extended to include an early winter sample as well as one in early spring just prior to egg eclosion. The survey should be expanded into areas of Denver where DFTM is increasing. Also any virus activity should be verified. An expanded survey would provide useful information to determine where and when to spray, and in time, provide data for predicting population trend of Douglas-fir tussock moth.





