Yellowheaded Spruce Sawfly

Pikonema alaskensis (Rohwer)
Hymenoptera: Tenthredinidaedae

Morse, B. W.; Kulman, H. M. 1985. Monitoring damage by yellowheaded spruce sawflies with sawfly and parasitoid pheromones. Environmental Entomology 14:131-133.

Objective: To classify the population phase of *P. alaskensis* as either increasing or decreasing through pheromone trapping of the pest and its major parasitoid.

Abstract: Yellowheaded sawfly, *Pikonema alaskensis* (Rohwer), is an important native defoliator of spruce (*Picea* spp.) in Alaska, Canada, and the northeastern U.S., including the Lake States. Open grown spruces, such as those in ornamental plantings, plantations, and shelterbelts, are particularly susceptible to *P. alaskensis*. A single year of defoliation by *P. alaskensis* may result in growth loss, while defoliation over multiple years causes branch dieback, topkill, or tree mortality. Outbreaks may persist for 3 years, followed by population decline in the post-outbreak phase.

Pheromone traps can be used to monitor population densities of *P. alaskensis* and its parasitoid *Syndipnus rubiginosus* Walley (Hymenoptera: Ichneumonidae). Research conducted on white spruce [*Picea glauca* (Moench) Voss] in northern Minnesota showed that the population phase of *P. alaskensis* can be determined using the formula $\log(I) = 1.36 - 0.17 \log(S) - 0.25 \log(P) + 0.13 \log(S*P) - 0.3 \log(Ht)$, where I = a trend index based on defoliation, S = the number of trapped *P. alaskensis*, P = the number of trapped *S. rubiginosus*, $S*P$ = the interaction between S and P, and Ht = tree height. The *P. alaskensis* population is classified as increasing when $I > 1$ and decreasing when $I < 1$. Land managers can use this technique to monitor and plan control measures for populations of *P. alaskensis* approaching an outbreak phase of population growth.

Sampling Procedure: Use (*Z*)-10-nonadecenal and ethyl palmitoleate [ethyl (*Z*)-9-hexadecenoate] as lures for *P. alaskensis* and *S. rubiginosus*, respectively. Lures can be sandwiched separately between 16-mil polymeric films so that 1 cm^2 of film releases 0.67 mg/cm^2 sawfly pheromone or 0.62 mg/cm^2 parasitoid pheromone. Bait Pherocon II pheromone sticky traps (Trécé, Adair, OK) with 1 cm^2 of film of either the sawfly or parasitoid pheromone. Hang traps 1.5 m above ground in white spruce stands. Traps should be installed in early May for *P. alaskensis* and in early June for *S. rubiginosus*. Remove both traps after one month. Sort trap contents and record the cumulative numbers of trapped male *P. alaskensis* and *S. rubiginosus*. After trapping has ended, determine the average tree height of the trees surrounding each trap.

Calculate the trend index for each group of trees surrounding each trap using the following formula:

$$\log(I) = 1.36 - 0.17 \log(S) - 0.25 \text{ Log}(P) + 0.13 \log (S*P) - 0.3 \log (Ht)$$

where I = a trend index based on observed defoliation, S = the number of trapped *P. alaskensis*, P = the number of trapped *S. rubiginosus*, $S*P$ = the interaction between S and P, and Ht = tree height. Classify populations of *P. alaskensis* as increasing (pre-outbreak) if $I > 1$ or decreasing (post-outbreak) if $I < 1$. Consider implementing control measures if the population is increasing.

Notes: The authors presumably installed paired *P. alaskensis* and *S. rubiginosus* traps on the same tree within each plot but they did not specify how far apart trap trees should be separated nor did they recommend a specific number of traps to install in a stand. Clearly a sufficient number of traps must be installed throughout a stand to reduce variation among trap pairs and accurately classify *P. alaskensis* populations as increasing or decreasing. The model is applicable only to areas where *S. rubiginosus* occurs as a major parasitoid of *P. alaskensis*.