Pest insects and pest management in Swedish spruce seed orchards

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Extended abstract

In Sweden, seed orchards are established to produce high quality seeds for reforestation. These seeds not only have a high market value (currently c 1100 Euro/ kg), but trees derived from these seeds ensure higher increment and better wood quality than do trees that originate from seeds collected in the forest. Seed production in Norway spruce seed orchards is far below the demand. One reason for the low and unpredictable seed production is damage caused by insects. Among the most serious pests are three lepidopteran species, *Cydia strobilella* L., (Tortricidae), *Dioryctria abietella* Den. et. Schiff.(Pyralidae), *Eupithecia abietaria,* Goetze (Geometridae) and one dipteran species, *Strobilomyia anthracina* Czerny (Anthomyiidae). Since 1996 we have been working with pest management in seed orchards. In trials 1996, 2000, 2002 and 2003 we used *Bacillus thuringiensis* var. aizawai x kurstaki, active against lepidopteran species. We found that this biological insecticide reduced damages of *D. abietella* and *E. abietaria* from about 60 % to 20 %, but did not affect *C. strobilella*. In order to reduce damage of all insects we started trials with injections of systemic insecticides (mainly imidacloprid and abamectin). Due to low densities we could not evaluate the efficacy of the insecticides against *C. strobilella* and *S. anthracina*, but according to preliminary results, *D. abietella* and *E. abietaria* were reduced from about 25 % to 10 %. In 2007 we have injected higher volumes in order to achieve greater damage reductions. During 2007, we have also monitored *D. abietella* using a new pheromone formulation. In the traps we found almost exclusively this species which indicates that it could be possible for the seed orchard keeper to use this pheromone in order to decide if and when pest management should be used.