

## II. Pome Fruits

### d. Chemical control

Pear psylla (PP); *Psylla pyricola* Foerster

Everett Burts  
Washington State University  
Tree Fruit Research and Extension Center  
1100 N. Western Avenue  
Wenatchee, WA 98801  
509-663-8181

Adult pear psyllids were tested using the slide-dip technique of Follet et al. to determine susceptibility to pyrethroids and pyrethroid-piperonyl butoxide combinations. Adult pear psylla were collected from orchards at the Research Center and other locations in central Washington. Test psylla were attached to 1" X 3" glass microscope slides by placing them on their backs and gently pressing their wings onto the sticky surface of strapping tape. Strapping tape was attached to slides with double-sided transparent tape. Psylla were not attached directly to transparent tape because the adhesive was not strong enough to hold them. Psylla on slides were dipped for 5 seconds in water dilutions of candidate pesticides, then placed in covered plastic refrigerator trays (12" X 10" X 4") with a layer of moist paper toweling on the bottom to increase humidity. Controls were dipped in tap water. Tests consisted of 5 serial dilutions of each candidate pesticide. Treatments were replicated 3 or more times and each replicate included a water-only control. Mortality was determined at 24, 48 and 72 hours after treatment by teasing each test psylla with a 000 size camel's hair brush. Those responding to this stimulus with rapid leg movement or with a typical jumping movement were classed as alive. Mortality checking was done using a binocular dissecting microscope.

Results show an increased resistance of overwintered adult PP to Pydrin. The lab dosage of 90 ppm is equivalent to the field use rate when 400 gallons of spray are applied per acre. This dosage killed only 34 percent of test psylla. A few years ago kill was near 100 percent at 45 ppm. Results were quite different when the synergist piperonyl butoxide was added to Pydrin; nearly 100 percent kill was obtained at dosages as low as 11.25 ppm after 3 days' exposure. The poor kill by Pydrin alone and the strong synergistic effect of piperonyl butoxide demonstrate two points about psylla susceptibility to pyrethroids: that populations in Washington are becoming resistant and that the resistance is caused by increased activity within the psylla of mixed function oxidase, an enzyme system that is known to deactivate pyrethroids and some other pesticides. Generally resistance due to increased mixed function oxidase can be overcome and commercial control can be obtained, at least for a while by adding synergists to sprays that deactivate this enzyme system. Butacide 8, a commercial formulation of pbo designed for mixing with pyrethroids in water diluted sprays is available and registered for use on crops in Washington. It has been used on pear in Italy and on other crops in the US to improve control of pyrethroid resistant insects.

Tests with summer-form adults were aimed at determining the optimum dosage of pbo for control of resistant adults and the extent of cross resistance to several pyrethroids. Results indicate that 75 to 150 ppm of pbo as Butacide 8 EC should produce maximum kill of pear psylla adults in field sprays. Populations tested were resistant to fenvalerate, permethrin and flucythrinate but not to fenpropanate or cyfluthrin. I do not know the significance of this resistance spectrum except that the first three compounds have been used to control winter-form adults in dormant sprays for several years while the last two are not registered for use on pear and therefore have not been used commercially. Additional work needed before this combination can be recommended include field trials to confirm lab results and determine the optimum ratio of pbo to pyrethroid. I will test this product this fall against winter-form psylla to determine relative effectiveness of synergized and non-synergized pyrethroids.