INTEGRATING LOW TOXICITY PESTICIDES AND NATURAL ENEMIES IN
THE NURSERY AND LANDSCAPE

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We have been involved in several projects to reduce use of toxic
pesticides in the landscape and nursery. In cooperation with Ellen Zagory and
staff at the University Arboretum in Davis, we have developed and instituted
a program that has reduced insecticide spraying in the nursery by 40%. Much
of this reduction can be credited to the use of an IPM intern who monitored
plants regularly to determine need for treatment. Treatment guidelines were
"seat-of-the-pants" and not research-based. Organophosphate and pyrethroid
insecticides were entirely eliminated and insecticidal soap, Bacillus
thuringiensis, and ant stashes the only insecticides applied. Soap sprays gave
good temporary control of most of the soft bodied, exposed insects and mites,
including lacebugs (Corythucha morrilli), aphids, and oak leaf phylloxera.
Insect problems that could not be controlled with soap sprays included stem
gall moths (Periplaca ceanothiella) on ceanothus, katydids chewing on redbud
and mealybug infestations on heuchera. Phytotoxicity due to soaps was
observed on redbud but not on California lilac, coyote bush, toyon, or valley
oak with up to 7 to 12 sprays between April and September. Observations at
the annual Arboretum plant sale indicated that customers did not
discriminate between plants damaged or undamaged by many pests. Katydid
chewing and necrosis on redbud leaves and agromyzid mining on verbena
did not reduce marketability. Lacebug damage on Baccharis actually
improved saleability over undamaged plants. However, valley oaks with
leaves heavily spotted from oak leaf phylloxera took four times as long to sell
as lightly spotted trees. Further investigation into customer tolerance for
damage is warranted.

Recently, we have tried to integrate a biological control component
into the arboretum IPM program with the use of green lacewing (Chrysoperla
rufilabris) releases on the roses, mealybug destroyers (Cryptolaemus
montrouzieri) on heuchera, and ladybeetles (Hippodamia convergens) on a
number of plant species. We have also investigated the toxicity of leaf
residues of commonly applied insecticides in the landscape (soaps, oils,
pyrethrum, malathion, carbaryl and a water control) on adult lady beetles
(Hippodamia convergens, Cryptolaemus montrouzieri) at weekly intervals.
Whereas toxicity of oils and soaps was insignificant one hour after spraying
and pyrethrum after a day, malathion and carbaryl continued to cause
significant mortality of ladybeetles up to 2 to 4 weeks after application,
depending on ladybeetle species and pesticide. Methods were "worst case"
with beetles exposed to excised leaves in petri dishes and entailing possible
exposure through a combination of ingestion, contact and inhalation.