

Phytophagous Mirid Bugs

Mullein plant bug: *Campylomma verbasci* (Meyer)

Apple brown bug: *Atractotomus mali* (Meyer)

Heteroptera: Miridae

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Introduction

Mullein plant bug (MPB) and apple brown bug (ABB) are occasional pests of apple and pear in New York. Because they occur in the same place at the same time and cause the same kind of damage, they are collectively referred to here as “mirid bugs.” In western New York, MPB is more prevalent than ABB. Both are considered beneficial for part of the season, being predators of pest mites and aphids. From bloom (when overwintering eggs hatch) until shortly after petal fall, however, they may severely damage fruit by feeding on flower parts or young fruit-lets.

Eggs

MPB eggs are laid, singly, in the fall under the bark behind leaf abscission scars on the current season’s growth. Only the tip of the egg protrudes from the bark. Eggs are minute (0.8 mm; 0.03 in.) and are flask-shaped. First egg hatch coincides with the pink to king bloom stage of Red Delicious. Peak egg hatch occurs at full bloom, and hatch is essentially complete by petal fall (see fig. 6 on page 2).

ABB also overwinters as an egg which is laid in mid-summer. Eggs are generally laid in groups and are almost always laid on new spur wood. Eggs are minute (1 x 0.2 mm; 0.04 x 0.008 in.) and are flask-shaped (fig. 1a). The orange egg cap may be visible protruding from the bark behind leaf abscission scars (fig. 1b). Egg hatch occurs at approximately the same time as it does with MPB.



Figure 1a

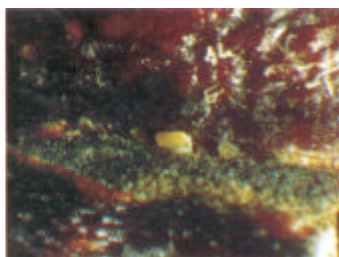


Figure 1b

Nymphs

MPB nymphs are small (1–2 mm; 0.04–0.08 in.) and lime green (fig. 2a). They might be confused with rosy apple aphid or white apple leafhopper nymphs (which appear in limb-tapping samples at about the same time), but they move much more rapidly. They may have a reddish cast after feeding on European red mites.

ABB nymphs are mahogany brown, are larger than MPB at the same sampling period, and have enlarged second antennal segments (fig. 2b).

Both species pass through five nymphal instars, which take about four weeks to complete, depending largely on temperature.



Figure 2a



Figure 2b

Adults

Adult MPB are small (3 mm; 0.1 in.) and green or brown with black spines and spots on their legs (fig. 3). They do not damage the fruit but are predaceous. They may be



Figure 3

found in fruit trees beginning in late June. Some may remain in the trees through the rest of the season and can often be seen moving among colonies of aphids. Most, however, migrate to mullein plants to lay eggs. In late summer or early fall, after another generation has been completed on mullein, the resultant adults will migrate back to fruit trees to lay overwintering eggs. Each female may lay an average of 40 eggs.

In contrast to MPB adults, ABB are slightly larger (3.5 mm; 0.15 in.) and are entirely dark, almost black. Like the nymphs, the adults have prominent second antennal segments. Adults appear midsummer, about four weeks after the nymphs. Female ABB lay about 20 eggs one to two weeks later.

Damage

Damage to developing flowers or young fruitlets is caused by first-generation nymphs of both species. Adults do not damage fruit. Nymphs puncture the epidermis (called a “sting”) by inserting their piercing mouthparts to feed. Damage first appears as reddish “pimples,” which become raised, corky, brown or black wart-like blemishes as the fruit expands (fig. 4a). Much of the injured fruit will abort by the time of the “June drop.” On dark-skinned varieties such as Red Delicious, minor blemishes may become less noticeable, and even disappear, as the fruit ripens. But severe blemishes and malformation of the fruit or minor blemishes on lighter-skinned varieties will make the fruit unmarketable (fig. 4b).



Figure 4a



Figure 4b

Some varieties appear to be more susceptible than others, although any variety can be attacked. Red Delicious, Golden Delicious, Northern Spy, and Spartan are reported to be among the more sensitive, whereas McIntosh seldom suffers damage.

Monitoring

Mirid bug presence can be determined by tapping limbs with a length of hose or a stick over a tray covered with black cloth (fig. 5). Monitoring should take place every two to three days beginning at pink and continuing through petal fall. New growth, with a higher proportion of flower than leaf clusters, should be sampled by tapping two or three times. Look for rapidly moving, minute, lime green (MPB) or mahogany brown (ABB) nymphs. Four limbs on each of 10 trees (40 limbs total) should be tapped in each block.



Figure 5

It is difficult to predict where and when mirid bugs may become a problem. Monitoring should begin in areas where damage has been noted previously. Look also in trees near weedy areas inhabited by mullein (fig. 7a) or evening primrose (fig. 7b). Last year's fruit wood may be excised and placed in water in a warm place, such

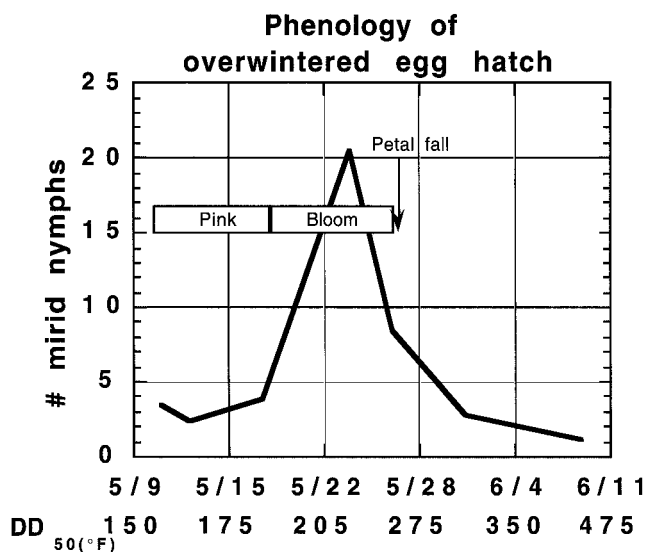


Figure 6



Figure 7a



Figure 7b

as a greenhouse, to force eggs to hatch. This method can be used to determine whether mirids are present before trees begin to develop. Research is ongoing to determine whether catching adult MPB in pheromone-baited traps in the fall can be used to predict the presence of bugs the following spring. MPB pheromone lures are available commercially. Pheromone-baited wing traps with one-inch spacers catch the bugs most effectively.

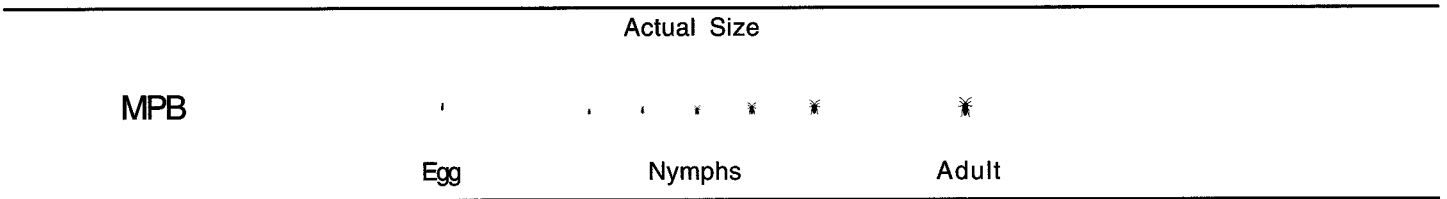
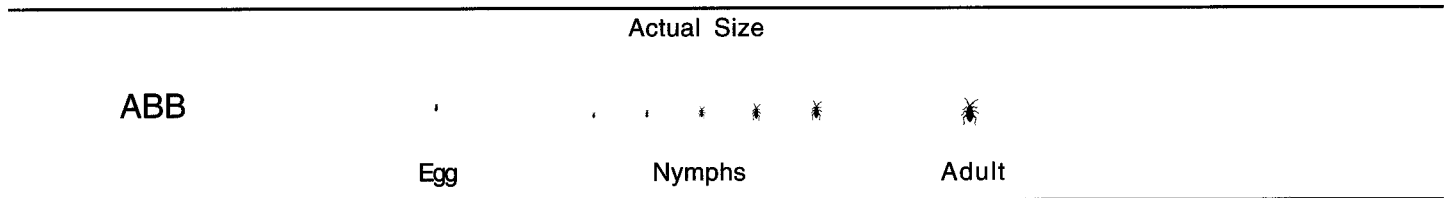
It is not certain whether actual densities of the spring nymphs can be predicted using either of these methods. They can be used, however, to identify at-risk orchards that should be intensively monitored by limb-tapping in the spring.

Management

MPB and ABB are pests only during the period from bloom through about the time fruit are 0.5 inches in diameter. After that, they are beneficial, preying on European red mite, aphids, psylla, and other insects. Some years, even if mirid bugs are numerous, they may cause no damage at all. But the damage they can do may outweigh the value of a forgone spray.

Timing of insecticide application is critical but difficult to ascertain. The fact that the peak hatch period is during full bloom, when no insecticides may be applied in New York State, makes prevention of all damage unlikely. At least some fruit damage is the result of nymphs feeding before petal fall. Insecticide application at pink is generally effective in controlling the nymphs and preventing damage, but effective residues may not be present long enough to prevent damage under certain conditions. Pink applications should be made as late in that growth stage as is safe for honey bees. Petal-fall insecticide applications will kill most of the nymphs present, but by that time some of the damage has already been done. Petal-fall sprays should be applied as soon as possible after blossoms are off.

Reliable treatment thresholds have not been developed yet for these pests in New York State. In Ontario, Canada, using the limb-tapping method of sampling starting at petal fall, a threshold of five to seven nymphs/25 tapped limbs is used to determine the need for control. Results from studies in New York suggest that a petal-fall application alone will not prevent unacceptable damage if this threshold is exceeded. If future studies show that first-generation nymph density can be predicted by trapping adults in the fall, then this threshold may be used to determine the need for an insecticide application at the pink stage. Consult the latest Cornell Cooperative Extension *Pest Management Recommendations for Commercial Tree-Fruit Production* for the most up-to-date information on insecticide selection and timing.



GUIDE TO STAGES

Stage	Timing	Where to Look
Eggs		
Overwintering	October to May	In bark, behind leaf abscission scars
Nymphs		
1st generation	Early to mid-May (bloom–fruit set)	In limb-tapping samples of previous season's fruit wood
2nd generation	Mid-July to mid-August	On blooming common mullein or evening primrose
Adult		
1st generation	Late June–July	Apple, among aphid colonies, or on common mullein or evening primrose
2nd generation	Late July through October	Pheromone traps in apple

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