

## SAMPLING AND MONITORING

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Determining the extent of the damage is the first step in deciding whether or not control is necessary. In assessing damage, it is necessary to associate the visible damage with the insects or mites present. In some instances, the damage may be old and the insects or mites that are present may not be the direct causative agent. In other situations, the insect or mite pests may have completed development and pupated or dispersed from the area. Control of insects or mites that have nearly completed their development may be of little immediate value, but subsequent observations and sampling should be made to detect later generations or immigrants. In all cases, be certain that visible damage is severe enough to warrant control.

Insect populations can be estimated using a number of different sampling devices. The method selected depends on the insect or mite and the habitat. In most agricultural situations, an insect sweep net is useful to estimate pest and beneficial populations. In using a sweep net, develop a uniform sampling technique. This permits comparisons among samples on different dates. Each sweep sample may cover an arc of  $180^\circ$  or  $90^\circ$  (straight sweep), with the net striking the upper 15 to 20 cm (6 to 8 inches) of the plant. Sampling for aphids and mites usually involves taking leaf samples from different areas of the infested plant. In some crops, it is only necessary to establish whether or not leaves are infested and it may not be necessary to count all the aphids or mites. It also is important to estimate the number of mite eggs and the number of mite predators on the leaves because this provides some opportunity to predict future problems.

Visual examination of the plant or habitat may be adequate to determine the presence of an insect or mite (aphids, Colorado potato beetle, thrips, etc.). It may be necessary to examine the roots or stems or limbs and trunks of plants to determine the presence of damaging insects (wireworms, root weevils, cutworms, stem and root borers, etc.).

Soil insects can be estimated by taking a standard core or volume of soil and sifting it through screens to detect insect pests (wireworms, white grubs, subterranean cutworms, root weevils, etc.). If available, Berlese funnels may be used to extract soil or debris dwelling pests. Other extraction techniques are available, but usually involve considerably more time and effort.

Traps are often useful to detect adult insects, but population estimation from trap counts is difficult. Black light traps attract large numbers of night flying insects and may be used to determine emergence patterns of insects. Bait traps or pheromone traps are also useful to determine emergence of some insects so that control measures can be timed more accurately. In some situations, pheromones may be employed as a mating disruption technique to provide control.

Populations of natural enemies should be estimated at the same time as sampling for pests. Sweep samples reveal adult Hymenoptera or Diptera parasites and Hemiptera predators. Natural enemies also may be observed during visual examinations for pests (mite predators, aphid mummies, lady beetle larvae or adults, sryphid fly larvae, etc.). Samples of soil or debris also may contain natural enemies or parasitized insects. If natural enemies are present, control may not be necessary or may be delayed until the impact of the natural enemies is known. Improper use of insecticides disrupts the balance among natural enemies and pests, and could cause more severe pest problems later.

Careful attention should be given to pollinators in the area. Visual observations will tell you whether or not pollinators are present, but care must be taken to determine the presence of honey bee colonies, alkali bee beds, leafcutting bee domiciles, bumble bee nests, etc. in the area. Misuse of insecticides often causes severe reductions in populations of pollinators.

**See Insect Control Guidelines in [\[IPM Practices\]](#) [\[Home\]](#)**