

Bethel College Mennonite Church Creation Care Committee Creation Stewardship Notes # 2 – May, 2003

According to recent news reports, the City of Wichita is concerned about the use of pesticides in city parks and residential yards. Chemicals used in our yards are an important source of environmental pollution. The average homeowner uses 10 times as much pesticide and fertilizer on a per acre basis as the average farmer does. Americans applied nearly 133 million pounds (\$2 billion worth) of insecticides, fungicides and fertilizers to their lawns in 1995. The U. S. Geological Survey has studied water quality in river basins throughout the country and found pesticides in samples from 99% of urban streams and 92% of streams in agricultural areas. Urban streams had the highest pollution with insecticides. These are chemicals washed from our land.

All of us are concerned about “insect pests” in our yards. There are more species of insects than all other animals combined. However only about 10% of insects have the potential to be pests to humans because of where they live and what they eat. Of these potential pests, 90% never cause significant damage. Their populations never become large enough to be damaging.

Most insect populations have a tremendous reproductive potential and capacity to increase. One female housefly in April could have 5½ trillion descendants by September if all young survived and reproduced. So why do the populations of most potential insect pests never become large enough to be actual pests? There are natural controls (predators that eat them, parasites that make them sick, etc.) on most populations that limit their growth. The populations of damaging pests are those that are poorly controlled, often because they have been introduced into a new area where there are no effective natural controls or their habitats have been simplified making controls less effective.

Many homeowners rely on routine use of chemical insecticides to control insect pests. However, most of these insecticides are general biological poisons that affect not only the target insect pest but also many other populations in our yards. Therefore they often reduce the effectiveness of insects and other animals that are predators or parasites on actual or potential pests. In the long run they cause old pests to become more troublesome and potential pests that had not caused damage to become actual damaging pests. Routine use of insecticides on a schedule each year creates a simplified ecosystem in which insecticides are necessary as the main control of insect pests. Also many of these insecticides or their breakdown products remain in the environment for a long time and may be transported by water or air and cause problems elsewhere.

Another approach to pest problems, called integrated pest management or IPM, attempts to protect natural controls of populations. It uses a wide range of techniques to minimize the damage from pest populations, using chemical insecticides **only** as a last resort to lower the population of a damaging insect pest. This approach does not try to eliminate pests but to keep their populations below a significantly damaging level. Entomologists have developed IPM systems for many agricultural crops. It is also possible to apply a similar strategy to our yards and gardens.

To protect and increase natural population controls in our yards requires the maintenance of diverse populations of insects, birds and other small animals. A diversity of small animals depends upon a diversity of plants and many environmental habitats. Can we enjoy a number of species in our lawns rather than a monoculture of one species of grass? We need to maintain some corners of denser vegetative cover so too much attention to trimming, mowing and clean cultivation reduces beneficial populations. It is particularly important to encourage predatory and parasitic forms like spiders, centipedes, predatory mites, predatory beetles, bugs and other insects (such as lacewings, praying mantids, ladybird beetles, etc.), and tiny wasps and flies, the larvae of which are parasitic or predatory on other insects. Nectar-producing flowers blooming in our yards throughout the growing season are helpful because the adults of many of the wasp and fly larvae feed on nectar.

Many native and cultivated plants will supply this nectar. A herb garden is beneficial because many herbs have flowers that supply nectar. To maintain good populations of these beneficial forms, it is necessary to strictly limit the use of pesticides in the yard.

Even so, there will be some insect populations that are poorly controlled and which grow large enough to cause damage. We need to use techniques to reduce the damaging effects of these troublesome pests, to make the environment in our yards less favorable for these pests and to make the environment more favorable for beneficial control organisms. These techniques can include:

1. Cultural techniques – Damage by the pest may be reduced by good growing conditions for the plant. Rapidly growing plants are able to resist a greater pest load without significant damage than those that are growing slowly because of other stresses. Many other cultural techniques can be used – crop rotations, mulching, cover crops, attention to times of planting, cultivating, and irrigating, properly handling crop residue at the end of the season, etc. Some crop plants will attract fewer pests if they are planted among other kinds of plants than if they are planted in solid monoculture stands.
2. Genetic techniques – Select varieties that are resistant to troublesome pests.
3. Physical restraints – Use row covers or other screening to keep pests away from the plants.
4. Augmenting populations – Purchase and release of predatory insects (such as ladybird beetles) or predatory nematodes can increase their populations at a critical time for effective control of the pest population (these are sold by mail and on the internet).

However, if a pest population is growing rapidly without evidence of control, or is already causing damage, we need to assess the risks and benefits of methods to lower the population. After such an assessment we may sometimes decide that it is better to accept some damage from the insect pest rather than intervene to lower the population.

If measures need to be taken to reduce the pest population, we must decide on the best technique. A method that is specific in its effect on the pest population but does not affect other populations will be best, if it is available and effective. Physically picking off a pest or using a spray, like insecticidal soap or Bt, that affects only a few types of insects are better than using a chemical that is toxic to many animals and humans. Because of their potential for damage to other organisms, chemical insecticides are used as a method of last resort in IPM. If we use a chemical insecticide, we should use the one that is most specific and loses its toxicity in the environment quickly. How the insecticide is applied and the timing of the application are also important. If the pest can be attracted to a toxic bait, adverse effects will be less than if a toxic insecticide is sprayed over an area..

Integrated pest management depends on more information about our yards and about pest populations, their life history and natural controls than relying on routine use of chemical insecticides. Sometimes the information is not available and management attempts fail. However every year we can accumulate more information and the results of new techniques tried can improve our pest management systems. The agricultural extension service, other homeowners and gardeners, books, and magazines can be a source of good ideas to try. Integrated pest management is one way of working with and preserving our corner of God's good creation and minimizes the polluting effects of attempting to dominate and control it. This is an important part of being good stewards of what God has given us.

(To learn more about IPM, go to the web page of the Bio-Integral Resource Center: www.birc.org. Dwight Platt has files of their journals *The IPM Monitor* and *Common Sense Pest Control Quarterly* as well as books and would be glad to share information from them. The last issue of *Common Sense Pest Control Quarterly* has a good 11-page article on "Integrated Weed Control for the Home and Garden.")