Five Integrated Pest Management Control Strategies

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Integrated Pest Management (IPM) is an ecosystem based approach to insect and disease management. IPM seeks to create garden and farm environments conducive to healthy plant development and beneficial insects, and less hospitable to pests and disease. As in human health management, some key actions are preventative rather than responsive. Specific control actions employed will vary with crop type, season, amount of pest pressure, and environmental conditions, but generally fall into one of several categories.

Natural Controls. While the gardener has no influence over natural controls, it is helpful to understand how they intersect with the gardeners' goals and situation. For example, mountain ranges to the west of the Klamath Basin are a natural control, slowing migration of pest insects from the coast and valley into our growing area. Our dry summer climate means that Klamath gardeners will encounter some plant diseases less frequently than in the Willamette Valley. Conversely, the abundant moisture this spring in the Klamath Basin meant that certain diseases, like powdery mildew, were more prevalent than in recent years.

Cultural Controls. These include a wide variety of practices around the way we raise (culture) our plants. Overhead watering is more likely to favor disease development than drip irrigation. Plants spaced too closely to each other or a building's foundation are likely to harbor insects and disease in interior pockets impervious to wind and cold. Companion planting is a popular practice that could be considered a cultural control, although controlled research on companion planting suggests there is more nuance to it than some writing on this topic suggests. **Host plant resistance,** varieties that are less susceptible to pests, is sometimes lumped with cultural controls in IPM literature, or may be listed separately. Resistant varieties do not exist for every plant/ pest combination, but should be used where they exist.

Physical/ Mechanical Controls. Fencing, traps, barriers, covering plants with a cloth to prevent egg laying, mulching, reflective tape to deter birds- gardening catalogs are full of examples of physical and mechanical IPM controls not usually explicitly described as such. Drastic commercial examples include the use of air cannons in berry orchards, programmed to go off at irregular intervals to deter bird feeding. (Mostly, the cannons just interrupt the feeding.) A far more festive option is the use of "inflatable dancers", commonly used in car sales lots to deter birds from leaving droppings on cars. Those same dancers are effective as scarecrows in berry orchards: see https://fruitgrowersnews.com/article/inflatable-dancers-scare-off-birds/.

Biological Controls. Sometimes shortened to "biocontrols", this category includes beneficial insects and mites, whether naturally present in the system, or purchased at an insectary and introduced into the crops. Also included are pesticides derived from plants or bacteria- think Bt, Neem, and similar products. Termed biopesticides, this is an area currently seeing lots of research and advancement. While not all beneficial insects or biopesticides are available (or economically feasible) for homeowners at this time, recruiting beneficial insects into the home garden to control some pests is fairly easy: provide appropriate habitat and plant material. The Xerces society provides detailed information on how to go about providing beneficial insect habitat: https://www.xerces.org/wp-content/uploads/2016/10/Habitat-Planning-Beneficial-Insects_Feb2017_web.pdf.

Chemical Controls. While there are no restrictions the types of pesticide used in an IPM program (i.e, organic or conventional), chemicals are always considered the option of last resort in an IPM program- due to potential impacts to beneficial insects, and to the greater environment. Generally, IPM recommends that the pesticide used be specific to the problem insect or disease instead of broad spectrum, and practitioners are encouraged to use the product with the least potential for negative environmental impacts. Surprising to some, when all potential impacts are considered, sometimes the IPM practitioner will choose a conventional pesticide over an organic one. For example, many organic insecticides have a very short window of effectiveness, meaning that in some situations they will need to be applied multiple times over a growing season. Compared to a conventional pesticide providing longer protection without impacts to beneficial insects, the organic treatment requiring multiple tractor passes over a field and significantly more labor may be less optimal. One detailed discussion of conventional and organic pesticides, covering misconceptions about the use of pesticides in organic agriculture can be found here: https://blogs.scientificamerican.com/science-sushi/httpblogsscientificamericancomscience-sushi20110718mythbusting-101-organic-farming-conventional-agriculture/.

Some of the practices that now fall under the umbrella of IPM, like crop rotation, have been practiced in agriculture for centuries. Others, such as biopesticides, are rapidly changing and growing in today's agricultural environment. The concept of using all the tools available to manage pests rather than reliance solely on chemicals, thus reducing negative impacts to the environment, is central to IPM. The Master Gardener plant clinic in Klamath County is open through September, and able to assist with questions about implementing IPM in home gardens.