

Onions

Diseases

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Causes of Production Problems

Overview

Various constraints can influence plant survival as well as bulb size and quality, and thereby affect crop productivity and profitability. This section will review some of the general aspects of these types of pests.

Viruses are the smallest infective agents that can cause diseases in onions such as onion yellow dwarf. They are invisible under an ordinary light microscope but their shape and size can be determined with an electron microscope. They are composed of complex protein and nucleic acid substances, and multiply rapidly in the plant. They are transmitted by insects, physical contact or sometimes in seed, depending upon the specific virus.

Mycoplasmas are microscopic single-celled organisms which lack cell walls. They are transmitted by insects such as leafhoppers, and cause aster yellows.

Bacteria are microscopic single-celled organisms which possess cell walls and multiply very rapidly in onion foliage and/or bulbs to produce diseases such as bacterial soft rot and slippery skin. Infection and spread are favored by moisture and wounds that may occur during mechanical cultivation and storms.

Fungi are microscopic plants that depend on higher plants or decaying organic matter for their existence. Generally, fungi produce large numbers of spores or survival structures which are carried to their host plants by wind, rain, insects, machinery, or man. Under favorable conditions of temperature and moisture, the spores germinate and infect healthy plants. Common fungal diseases include Fusarium basal rot (soil-borne), purple blotch foliar) and Botrytis neck rot (storage). Between growing seasons, many fungi survive in plant residues or in soil as dormant spores, mycelia, or sclerotia.

Nematodes are microscopic worm-like organisms that live in the soil. The principal nematode problem of onions is the stem and bulb nematode. If they move into the roots of the plant to feed, they are called endoparasites. If they remain outside the root while feeding, they are termed ectoparasites. When nematodes are present in large numbers, they weaken the plants, reducing their yields and possibly predisposing root systems to infection by other soil-borne pests.

Insects such as thrips and maggots are an extremely common and diverse group of animals. Physically, adult insects are characterized by having three pairs of legs, three body segments (head, thorax, abdomen), and a winged adult stage. However, insects undergo changes in form (metamorphosis) as they develop, and can have a wide range of forms and habits. Although some insects feed upon plants and may become plant pests, the great majority have innocuous or beneficial habits.

Onions do not compete well with weeds. Competition research has shown that onions must be maintained weed-free for a minimum of six weeks for maximum yields. In western areas, growers rely upon a few herbicides such as Dacthal, Goal, Buctril, and Fusilade. Pre-emergence herbicides suppress weed seedlings and allow onion seedlings to gain a developmental and height advantage. Post-emergence herbicides and mechanical cultivation provide later-season control of weeds that escaped control at planting or germinated after earlier treatments.

The more common weeds that concern onion producers include barnyard grass, foxtails, bindweed, yellow nutsedge, kochia, lambsquarters, black nightshade, pigweed, ragweed, and Russian thistle. Parasitic plants, such as dodder possess roots, leaves and germinate from seeds. They do not photosynthesize and feed on other plants such as onions by producing pegs (haustoria) which penetrate host tissue. Dodder lacks chlorophyll and is usually yellow or orange-colored in infested fields. The plant is spread by seed and tissue pieces during cultivation or human involvement.

Environmental and other abiotic stresses can adversely affect plant growth and predispose plants to further damage by other production problems, such as plant pathogens and insects. Temperature and moisture extremes can induce obvious stresses, as can fertility imbalances, soil alkalinity, high salt concentrations, poor drainage, or air pollution (ozone).

General Management Recommendations

The objective of pest management for cultivated plants such as onions is to limit economic losses and protect the value of the crop. Management measures are justified to the extent that their cost, in terms of money and effort, is less than losses caused by the problem. The control measures chosen must also be compatible with production systems, marketing objectives, and consumer preferences. Because it is generally easier and more advantageous to prevent pests than to eliminate them, crop sanitation always should be practiced. Methods include crop rotation, selection of resistant varieties, use of appropriate cultural practices to reduce plant stress and/or not to favor pest spread and development, soil fumigation, and pesticide treatment of seed, soil and foliage. Foliage protection, especially during the last few weeks of crop development, is important to achieve acceptable bulb size, yield, and quality.

The remainder of this section will review individual pest management problems and specific recommendations based upon research results from Colorado State University

and elsewhere. Always consult chemical labels and updated university and industry guidelines for specific pesticides and application rates.

Categories: Onion, Disease Management

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