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Black nightshade: a soybean pest

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One of the several nightshade species found in this country, Eastern black nightshade (Solanum ptycanthum), also called deadly nightshade, competes with crops, is toxic to livestock, contributes to harvesting and storage problems, and reduces the quality of soybeans. Although poisonous weeds should be managed with caution, toxicity is not the major problem with nightshade. Because black nightshade is fairly inconspicuous in a soybean field, you may be unaware of its presence during the growing season. But you'll know it's there during harvest when a sticky, balled-up mass of material accumulates in the combine. So mechanical obstruction during harvest operations is the real problem when the weed has infested your crops.

Black nightshade is fairly inconspicuous in a soybean field, so you may be unaware of its presence during the growing season.

How it grows

Although nightshade has not been a major weed problem in Missouri, it appears to be spreading rapidly. During recent years, its appearance has been reported in several parts of the state. Nightshade is widely distributed throughout the U.S.

An annual, nightshade originates from a seed that germinates during the spring or summer. During the fall, the plant dies after the seeds have matured.

Nightshade grows to a height of about 2 to 3 feet. (See Figure 1.) It is bushy and freely branched with leaves that are slightly lobed. Ivory-white flowers are tiny and star-shaped with five petals; they are borne in clusters of varying number. The globular fruit is about the size of a garden pea and green; it becomes shiny black at maturity. Each fruit contains from 50 to 100 seeds, each about the size of a pinhead, that are surrounded by a sticky, clear substance. It is not uncommon for a single nightshade plant to produce up to 100,000 seeds.

In a study reported in the *Journal of Agricultural Research* in 1946, black nightshade seed buried for a period of 39 years was 83 percent viable. The high percentage of seed germination and the number of seeds produced are significant factors contributing to the rapid spread of the weed. Consequently, a few scattered plants in a given field have the potential of rapidly infesting the entire area.

How it spreads

Dispersal of nightshade seed occurs in several different ways. When green or mature berries are crushed during the harvesting process, the tiny nightshade seeds are literally cemented to the seedcoat of the beans by the viscous substance released from the berry. Consequently, nightshade can actually be planted along with the beans.

When the mature berry eventually dries, the outer skin disintegrates and releases the seeds onto the soil surface. Wind and water can then disperse seeds in all directions.

Birds will eat the berries, and the seed will be spread by their droppings.

Livestock generally will not graze nightshade, but if they do so, a certain percentage of seeds will pass through their digestive tracts. Since nightshade can spread in several different ways, it is important to prevent plants from going to seed.

Plants are poisonous

The poisonous substance in nightshade is an alkaloridal glucoside called *Solanine*. It is found in varying amounts in the stem, leaves, and fruit. The concentration is higher in green, immature berries than in the mature fruit. The degree of general toxicity varies with the environment. Contributing factors include soil types, fertility, and climatic conditions.

Death losses have been recorded for all classes of livestock including poultry. Generally, cattle avoid grazing nightshade, except when they are turned into a grain stubble field where it may be the only green and succulent forage. Human deaths have also been recorded.

Plants cause harvesting problems

A plugged combine during harvest probably is the main problem Missouri farmers have with nightshade. It only takes one nightshade plant in 10 feet of row to stop a combine. The berries entering the combine can exude enough viscous material to create an inseparable cemented glob of stems, leaves, dirt, beans, and field refuse. Lost time and lost tempers, damaged equipment and stained beans are then common. Beans stained by the juice from nightshade berries run the risk of dockage when sold. Other concerns are storage problems of heating and seed mold.

Controlling nightshade

Unfortunately, the nightshade problem in soybeans does not have a single, simple solution. The desiccants, Paraquat and Leafex 3, labelled for use on soybeans, will defoliate the leaves but will not dry up the berries. Delaying harvest until after a killing frost will desiccate foliate, but the fruits remain succulent and can still stain harvested beans.

Control of nightshade in soybeans can be affected by proper use of various herbicides. The following have performed satisfactorily:

Preplant incorporated
- Dual
- Lasso
- Dual + Amiben
- Dual + Sencor or Lexone
- Lasso + Sencor or Lexone

Preplant + overlay
- Dual then Amiben
- Dual then Sencor or Lexone

Pre-emergence
- Amiben
- Dual
- Amiben
- Lasso
- Lorox + Lasso or Dual

Postemergence
- Blazer

Of these herbicides, Amiben, Dual, and Lasso have been effective, but they have limitations. Amiben provides good early-season control but has a short residual life, so late germinating weeds escape. Dual is effective when applied on light and medium-textured soils but does not perform consistently on heavy soils. Lasso is similar to Dual in this respect. Amiben, Dual, and Lasso remain effective longer if applied pre-emergence rather than preplant incorporated.

Under favorable conditions, nightshade seedlings will emerge throughout the summer. If not controlled, they grow rapidly. In some situations, cultivation reduces the stand, or a postemergence herbicide can be used. Blazer applied at 2 pints per acre at the two- to four-leaf stage is highly effective in controlling nightshade. A tank mix of Blazer and Basagran will not only control nightshade but will also control most other annual broad-leaved weeds.

Finally, crop rotation can be used to advantage in a nightshade control program.

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