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Identification of Six Alternative Winter Annual Weed Hosts for Soybean Cyst Nematode

There are six winter annual weeds that have been identified as alternate hosts to soybean cyst nematode, and we have observed that SCN can reproduce in the field on purple deadnettle. Fields with these weed hosts may be increasing SCN population densities at a faster rate than fields without weed hosts. A recent study in Indiana found that known SCN weed hosts were prevalent in 93 percent of the fields surveyed (Creech and Johnson, 2006), indicating the possibility of a statewide increase in nematode population densities due to weeds. In Indiana SCN has been found in 82 of 92 counties (Faghihi et al. 2006).

Most of these weeds can start to emerge during late august and September. So consider using this guide to scout fields and determine if you have these weeds present and if the density or future cropping plans would warrant fall treatments for winter annual weeds.

The purpose of this article is to point out the identifying characteristics of each of the six hosts. We will discuss the weeds in the order of strongest to weakest host.

- Purple deadnettle (strong host)
- Henbit (strong host)
- Field pennycress (moderate host)
- Shepherd's-purse (weak host)
- Small-flowered bittercress (weak host)
- Common chickweed (weak host)

Purple deadnettle and henbit are strong hosts and it can be difficult to distinguish the two weeds when they are small.

Purple Deadnettle (*Lamium purpureum)*

Leaves: Cotyledons have a white tip, and are oval with a notch where the petiole connects to the cotyledon. Leaves have prominent venation, resulting in a crinkled look (Figure 1). Leaves at the base of the stem are hairy and circular in shape. Leaves at the top of the stem are hairy and triangular in shape.

Stems: Square and greenish-purple in color. Stems tend to branch at the base of the plant and have hairs that point downward.

Flowers: Blooms are purple, and occur in upper leaves in whorls of 3 to 6. Purple deadnettle blooms between April and October (Figure 2).

Figure 1. Purple deadnettle seedling

Figure 2. Purple deadnettle flowers

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Henbit (*Lamium amplexicaule)*

Leaves: Cotyledons are oval, have a white tip, and notched where the cotyledon and petiole meet. Leaves are circular with rounded teeth along edges and slight venation which causes a crinkled look. Leaves have hair on their upper surfaces and hair along the veins on their lower surfaces (Figure 3). Leaves at the top of the stem wrap around the stem and are sessile.

Stems: Stems are square, tend to branch near the base of the plant, have hairs that point downward, and are green or purple.

Flowers: Flowers are purple to pink. Henbit can flower from March to November (Figure 4).

Figure 3. Henbit seeding

Figure 4. Henbit flowers

Field pennycress and shepherdspurse are weaker hosts than purple deadnettle and henbit. Much like purple deadnettle and henbit, these weeds can be difficult to distinguish from one another.

Field Pennycress (*Thlaspi arvense*)

Leaves: Cotyledons are oval and have a bluish-green tinge with a long petiole. When the basal rosette forms, the leaf margin is wavy and slightly toothed (Figure 5). Leaves are egg-shaped, light green, and hairless. At maturity, no basal leaves are present. After bolting, leaves on the stem are oblong to lanceolate, have no petioles, have toothed leaf edges, and lobes that are pointed and clasp stem. Leaves emit a strong odor when disturbed.

Figure 5. Field pennycress rosette

Figure 6. Field pennycress fruit

Stems: Stems have no hairs. The leaves generally fall off the stem as the plant matures and can be branched in the top part of the stem.

Flowers: Flowers are white with four petals. Field pennycress flowers from April through June, and has a round seed pod (silicle) with a winged margin that is notched at the tip (Figure 6).

Shepherd's-purse (*Capsella bursa-pastoris*)

Leaves: Cotyledons have long petioles, and are egg shaped to round and narrower at the base. Young leaves are round and slightly hairy on surface with slightly toothed margins. Generally, deeply lobed to deeply toothed leaves form around the 5th to 7th leaf and are dark green to silvery-gray (Figure 7).

Figure 7. Shepherd's-purse rosette

Figure 8. Shepherd's-purse fruit

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Stems: Stems are unbranched and slender with gray hairs.

Flowers: White with four petals. Flowers from spring to early summer and sometimes in autumn. Seed pod is heart-shaped (Figure 8).

Small-flowered bittercress (*Cardamine parviflora*)

Leaves: Basal leaves are deeply lobed, which gives the appearance of 3-6 pairs of leaflets with a rounded terminal leaflet (Figure 9). There are 4-10 stem leaves and no basal leaves at maturity. Leaves are generally hairless, but can be slightly hairy.

Stems: Branched with some leaves.

Flowers: Flowers are white with four petals. The seed capsule is a silique, which is long and narrow (Figure 10).

Figure 9. Small-flowered bittercress rosette

Figure 10. Small-flowered bittercress fruit

Common Chickweed (*Stellaria media*)

Leaves: Cotyledons are slender and ovate. Young leaves are opposite and round to egg-shaped with pointed tips. Mature leaves are oppositely arranged, light green, egg-shaped, pointed at the tips, and hairless (Figure 11). Hairy petioles occur on most leaves, but petioles are not present on the upper leaves (Figure 12).

Stems: Stems start to branch when five leaf pairs form. Stems are light green and generally smooth, but may have 1-2 rows of hairs.

Flowers: Flowers have five white petals that bloom from early spring to autumn.

It is important to reemphasize that these weeds can be found in a large percentage of no-till or reduced till fields in Indiana, and that SCN has been found in 82 of 92 counties in Indiana. We have conducted a number of field, greenhouse, and lab studies, funded by the Indiana Soybean Alliance and the USDA, to investigate the interaction between these winter weeds and SCN. We will discuss winter weed management in future articles, but for now, if you have any of these 6 hosts, and particularly the strong hosts, you should be concerned about management of these weeds and how that may impact soybean profitability.

Figure 11. Common chickweed seedling

Figure 12. Common chickweed mature plant

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Glossary

basal rosette: Leaves radiating from the stem of the plant in a circular cluster at ground level.

cotyledon: The seed leaf.

leaflet: One subunit of a compound leaf.

petiole: The stalk between the stem and leaf blade.

sessile: Lacking a petiole.

silicle: Fruit of the Brassicaceae that is not much longer than wide (if at all).

silique: Fruit of the Brassicaceae that is an elongated capsule.

terminal leaflet: Occurs at the tip of the main compound leaf as a single subunit.

winter annual: Plant that germinates in late summer to early spring, flowers, produces seed in mid- to late spring, then dies.

References

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Photo Source: Earl Creech, Kevin Bradley, and Valerie Mock