

Weed Seedling Identification

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Most weed identification manuals feature mature weeds and use flower and fruit characteristics as an aid in identification. However, the grower of crops must control weeds when they are small, before they flower, to prevent them from seriously competing with crops for nutrients and soil moisture. Also, accurate identification of these seedling weeds often is necessary to select the best herbicide or other method of weed control.

New weed growth may originate either from seeds or from vegetative reproductive structures (rhizomes, rootstocks, stolons or runners, tubers, corms or bulbs) of a perennial plant. True seedlings are those young plants that grow from seed and may include the annuals, which live for only 1 year, producing flowers and fruits that year; the biennials, which produce flowers and fruits the second year and then die; and the perennials, which usually produce flowers and fruits each year but continue to live for several years.

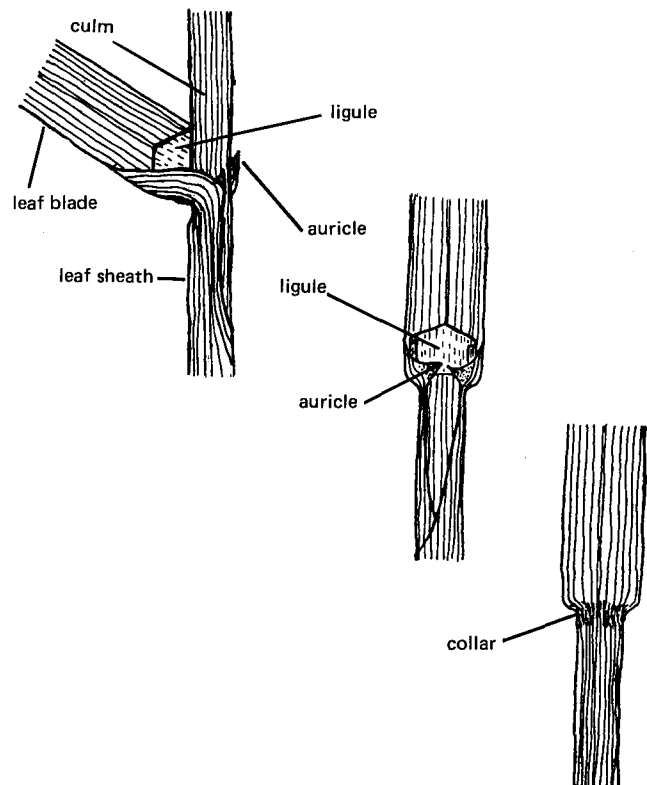
Weed seedlings also may be divided into grasses or grass-like plants and broadleaf plants.

GRASS WEEDS

Any or all of these vegetative characteristics may be useful to help identify a young grass weed:

- The grass weeds usually have long, narrow, alternate leaves with parallel venation (distribution or arrangement of veins), with an expanded leaf blade portion and a leaf sheath portion toward the base that encircles the stem (figure 1).
- The juncture of the leaf blade with the leaf sheath is called the collar area.

Figure 1. Vegetative grass parts



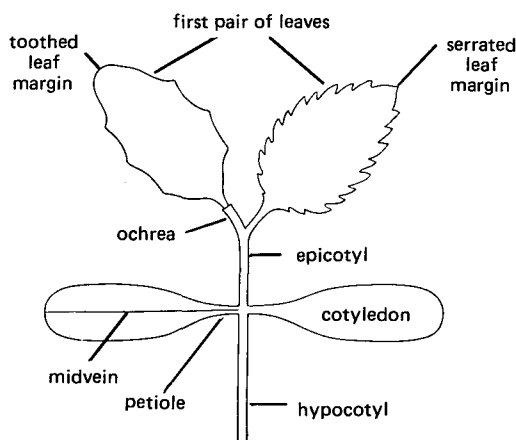
- Most grasses have a projection at the base of the leaf blade called a ligule, which may be either a membrane or a fringe of hairs or a combination of both.
- Some grasses also have claw-like or hook-like projections at the leaf collar called auricles that may partially encircle the stem.
- As grass leaves emerge from the bud shoot, they may be rolled (round) and overlapping or they may be flat and folded (V-like).
- Grasses have definite nodes (swollen ridges which encircle the stem) and internodes (portions of the stem area between nodes).
- Grass stems (culms) may be round or flattened, and leaf sheaths may be open and overlapping or they may be closed.
- Grasses may be smooth (glabrous) or hairy.
- Grasses are monocots, with one cotyledon or seed-leaf that remains in the soil after seed germination.
- Grasses are either annual, with a simple, fibrous root system, or perennial, producing rhizomes, rootstocks, or stolons.
- The seed of grasses often remains attached to the primary root after germination. If the grass seedling is carefully removed from the soil, the seed may help identify the plant.

BROADLEAF WEEDS

All of these characteristics help in identification of broadleaf weed seedlings:

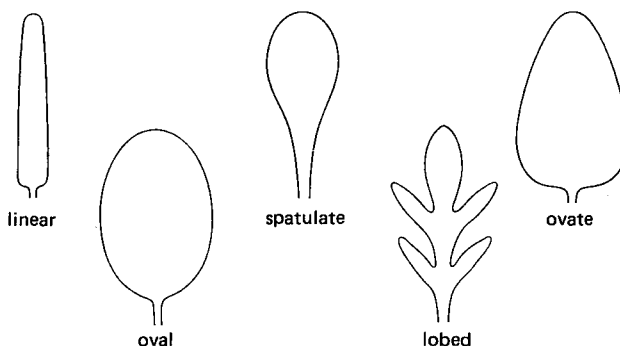
- Broadleaf weed seedlings, in contrast to the grasses, usually have wider leaves with net-like venation.
- Broadleaves are dicots and have two cotyledons or seed-leaves, which usually emerge above the soil and expand to become the first visible "leaves." The true leaves then develop above the cotyledons (figure 2). However, in some broadleaf species, the cotyledon (seed) remains in the soil and the plumule (growing point and cluster of undeveloped true leaves) emerges above the soil line.
- The shape and size of the cotyledons and first true leaves vary considerably among species (figure 3).

Figure 2. Vegetative broadleaf plant parts*



*Taken from old Station Bulletin 397, Agricultural Experiment Station, University of Minnesota.

Figure 3. Cotyledon and leaf shapes*



- The stem below the cotyledons is called the hypocotyl and the stem above the cotyledon is the epicotyl.
- Leaves may be alternate or opposite in arrangement on the stem. In some cases the second leaf may appear so closely behind the first leaf that they appear to be opposite but later prove to be alternate.
- The true leaves of broadleaf weeds usually have a petiole (leaf stalk), but in some species the true leaves may be sessile (without a leaf petiole).
- Cotyledons are usually hairless but may be rough, while true leaves and plant stems may be hairy or smooth.
- Leaf petioles in the Buckwheat (*Polygonaceae*) plant family are encircled by a membranous sheath, called an ochrea.
- Broadleaf weed seedlings may have an erect stem, be viny or twining in growth habit, or may be prostrate (growing flat on the ground).

CHARACTERISTICS OF COMMON GRASS WEED SEEDLINGS

Some common grass weed seedlings with their identifying vegetative characteristics follow:

Wild Oat

Leaf blade—rolled in round bud shoot; smooth; usually hairless, except ciliate (stiff, bristle-like hairs) often appear along lower edges

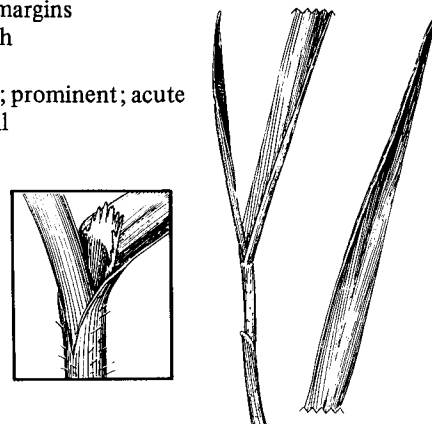
Leaf sheath—often pubescent (finely and densely hairy); open, with overlapping margins

Collar—broad; smooth

Auricles—absent

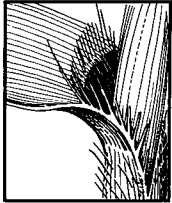
Ligule—membranous; prominent; acute

Growth habit—annual



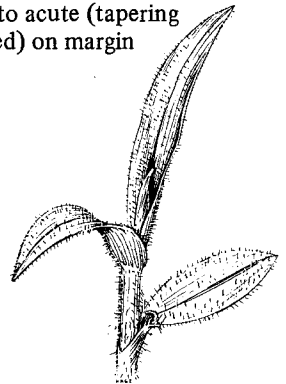
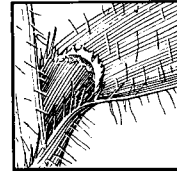
Green foxtail

Leaf blade—rolled in round bud shoot; smooth; finely veined
Leaf sheath—hairy; open, with overlapping margins and ciliate (stiff, bristle-like hairs) on outer margins
Collar—continuous (not divided by midvein)
Auricles—absent
Ligule—a fringe of hairs 1 to 2 cm long; fused at the base, with longer hairs at collar margin
Growth habit—annual



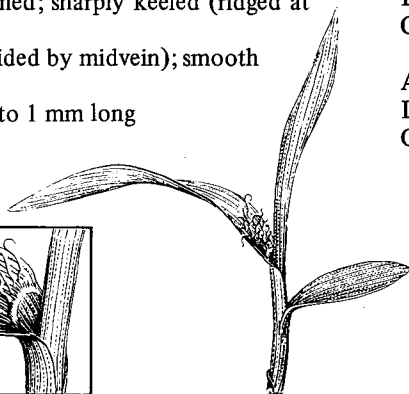
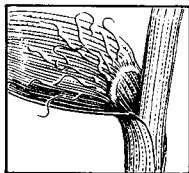
Crabgrass, large

Leaf blade—rolled in a round bud shoot; hairy on both surfaces; keeled (ridged) below
Leaf sheath—very hairy; open
Collar—broad; divided by midvein; hairy on outside edges
Auricles—absent
Ligule—membranous; prominent; rounded to acute (tapering to a point); slightly undulate (wavy-edged) on margin
Growth habit—annual



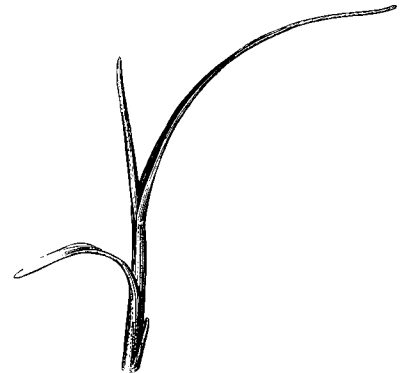
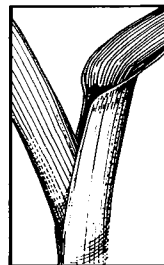
Yellow foxtail

Leaf blade—rolled in a flattened bud shoot; smooth except for several prominent whitish hairs near base on upper surface
Leaf sheath—smooth; flattened; sharply keeled (ridged at midvein)
Collar—continuous (not divided by midvein); smooth
Auricles—absent
Ligule—a fringe of hairs up to 1 mm long
Growth habit—annual



Barnyardgrass

Leaf blade—rolled in a flattened bud shoot; smooth; keeled (ridged) below
Leaf sheath—smooth; flattened; keeled; open
Collar—broad; continuous (not divided by midvein); yellowish-green; smooth
Auricles—absent
Ligule—absent
Growth habit—annual



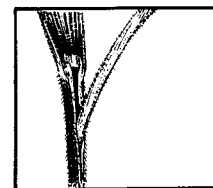
Giant foxtail

Leaf blade—rolled in a round bud shoot; pubescent (finely and densely hairy) on upper leaf surface, scattered hairs on lower surface; distinctly but finely veined
Leaf sheath—hairy; slightly flattened; keeled (ridged at midvein); open with ciliate (stiff, bristle-like hairs) on margins
Collar—continuous (not divided by midvein)
Auricles—absent
Ligule—a fringe of hairs 1 to 2 mm long; fused at the base; longer hairs at collar margin
Growth habit—annual



Quackgrass

Leaf blade—rolled in a round bud shoot; rough on upper surface; may be somewhat hairy
Leaf sheath—round; open with overlapping margins; usually pubescent (finely and densely hairy)
Collar—distinct; divided by midvein
Auricles—present; claw-like; slender
Ligule—membranous; short
Growth habit—perennial from whitish rhizomes (underground horizontal stems from which new plants can arise)

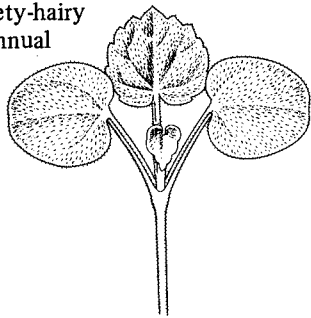


CHARACTERISTICS OF COMMON BROADLEAF WEED SEEDLINGS

Some common broadleaf weed seedlings with their identifying vegetative characteristics follow:*

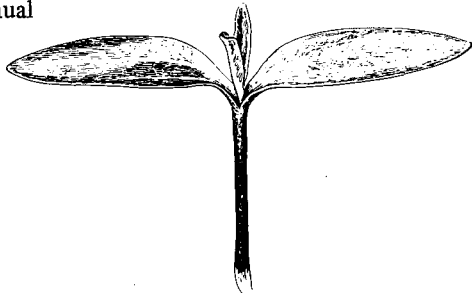
Velvetleaf

Cotyledons—spread about 32 mm; short; ovate, with long petioles; prominent and branched midvein; velvety-green
 Leaves—alternate; ovate, with serrated margins and long petioles; branched midvein; leaves and petioles velvety-hairy
 Hypocotyl—velvety-hairy
 Growth habit—annual



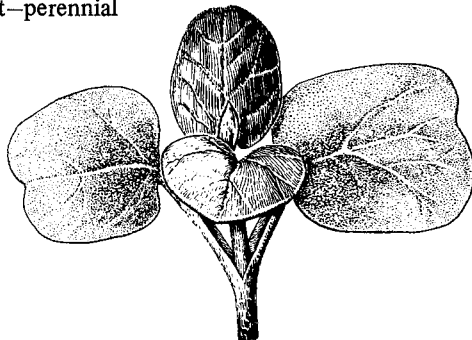
Cocklebur

Cotyledons—spread up to 80 mm; tend to be triple veined at base; long; narrow; acute (tapering to a point) at tip; sessile (no petiole); rough
 Leaves—opposite, becoming alternate; triple veined at base; veins prominent; rough-hairy; short petioled
 Hypocotyl—rough; purplish
 Growth habit—annual



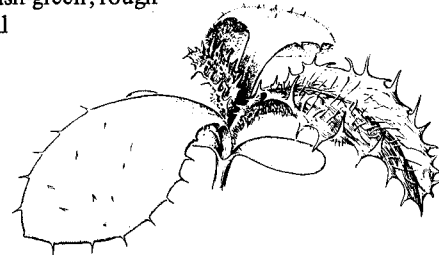
Field bindweed

Cotyledons—spread about 40 mm; broadly heart shaped; venation distinct; long petioled
 Leaves—dark green; shiny; glabrous; the first leaves heart shaped, margin indented at the petiole; later leaves sagittate (arrowhead shaped)
 Hypocotyl—smooth; often purplish; stem twining
 Growth habit—perennial



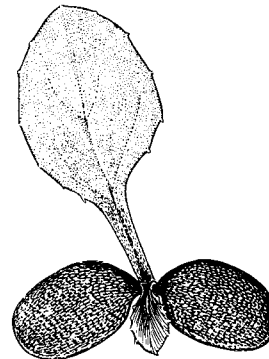
Canada thistle

Cotyledons—spread about 15 mm; oval; rough; distinctly veined
 Leaves—ovate; sessile (no petiole), with sharp spines and prominent midvein, becoming irregularly lobed
 Hypocotyl—short; whitish-green; rough
 Growth habit—perennial



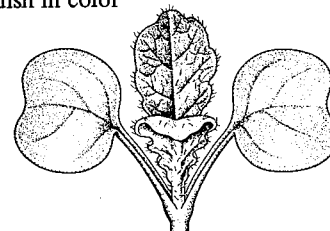
Perennial sowthistle

Cotyledons—spread about 20 mm; short petioled; obovate (widest near tip); smooth
 Leaves—first leaves smooth, shiny green, ovate, narrowed at base into a winged petiole; later leaves variously lobed or toothed; teeth reflexed (bent backward); weak spined; milky juice
 Hypocotyl—short; smooth; stem with milky juice
 Growth habit—perennial



Wild mustard

Cotyledons—spread about 26 mm; wider than long, with shallow oval notch or indentation at tip; long glabrous petioles; branched midvein
 Leaves—alternate; oval to spatulate (spoon shaped) with undulate (wavy-edged) or bluntly toothed margins; prominent and branched midvein; trichomatous (with hairlike projections) on leaves and petioles
 Hypocotyl—usually reddish in color
 Growth habit—annual



*Taken in part from old Station Bulletin 397, Agricultural Experiment Station, University of Minnesota.

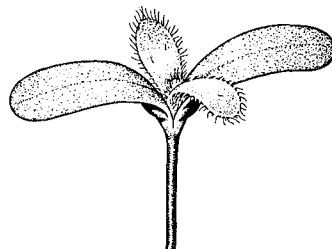
Kochia

Cotyledons—spread about 11 mm; linear shape with no petioles (sessile); sometimes faintly veined; gray or frosty-green on upper surface and red on lower; circular swelling at growing point between cotyledons

Leaves—appear opposite but become alternate—pairs are so close together they form a small rosette between cotyledons; linear shape with no petioles; very hairy

Hypocotyl—reddish to purplish in color

Growth habit—annual



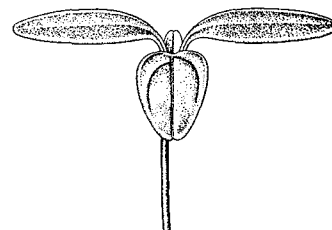
Redroot pigweed (Prostrate pigweed and Hybrid pigweed are very similar)

Cotyledons—spread about 14 mm; linear shape, with short petioles; lower surface and midvein on upper surface reddish in color

Leaves—alternate; ovate to oval, with indented tips and medium-long, sparsely trichomatous (with hairlike projections) petioles; branched midvein

Hypocotyl—light red in color

Growth habit—annual



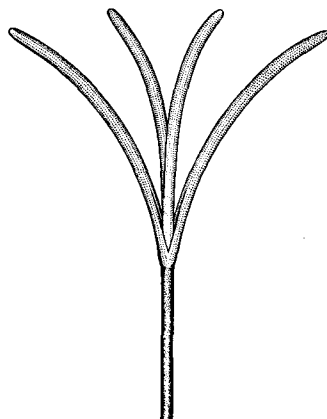
Russian thistle

Cotyledons—spread about 25 mm; extremely long, narrow shape, with no petioles

Leaves—opposite, becoming alternate; extremely long, narrow, thread-like shape, with no petioles; older leaves barb tipped

Hypocotyl—reddish in color

Growth habit—annual



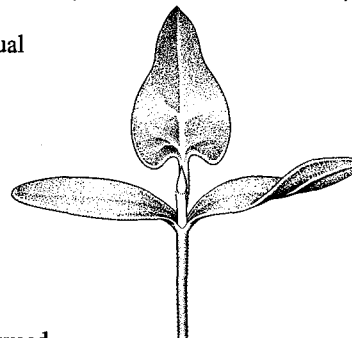
Wild buckwheat

Cotyledons—spread about 25 mm; linear shape, with short petioles; prominent midvein on lower surface and sometimes on upper

Leaves—alternate; ovate, with long, pointed tip giving a heart shaped appearance; long petioles; prominent and branched midvein; each bears an ochrea (membranous sheath) at base of petiole; small trichomes (hairlike projections) on stem and leaf petiole

Hypocotyl—short; reddish; often covered with short, bristle-like projections

Growth habit—annual



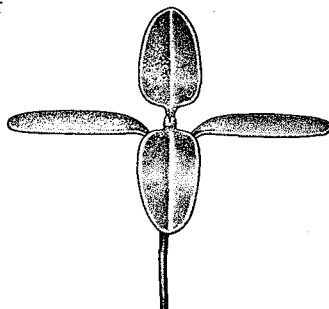
Common lambsquarters

Cotyledons—spread about 13 mm; linear shape; red on lower surface, light green on upper

Leaves—opposite, becoming alternate; oval to ovate; light green with frosty or white mealy appearance; short petioles; midvein with little or no evident branching

Hypocotyl—light red in color

Growth habit—annual



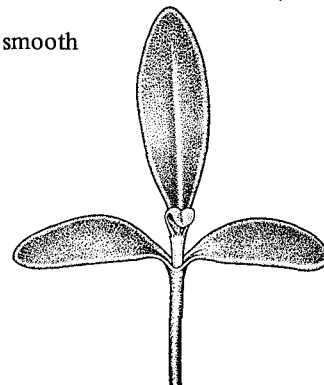
Pennsylvania smartweed

Cotyledons—spread about 41 mm; linear on one edge, curved on the other; reddish blotch on lower surface; sparsely trichomatous (with hairlike projections) on margins

Leaves—alternate; long oval to spatulate (spoon shaped); prominent midvein; each leaf bears an ochrea (membranous sheath) at base of leaf petiole; sparsely trichomatous (with bristly hairs) on margins

Hypocotyl—reddish in color; smooth

Growth habit—annual



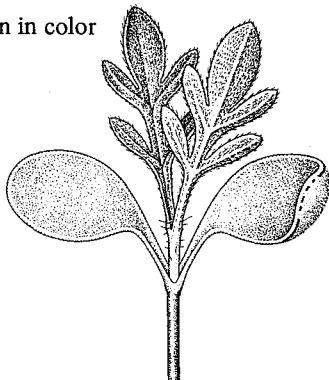
Common ragweed

Cotyledons—spread about 21 mm; broadly spatulate (spoon shaped) to short oval, with broad petioles; veined at base on lower surface, not veined to faintly veined on upper surface; thick and waxy, with dark spots on margin of lower surface and sometimes on upper surface

Leaves—opposite; five lobed, with terminal lobe sometimes toothed; branched midvein; long petioles; leaves and petioles densely hairy

Hypocotyl—purple to dark green in color

Growth habit—annual



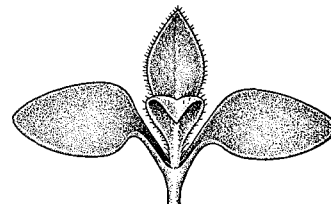
White cockle

Cotyledons—spread about 22 mm; ovate

Leaves—opposite; oval to spatulate (spoon shaped) with pointed tips; midvein on lower surface, absent or faint on upper surface; leaves and petioles densely hairy, greenish-gray

Hypocotyl—short; greenish-gray; hairy

Growth habit—biennial or short-lived perennial



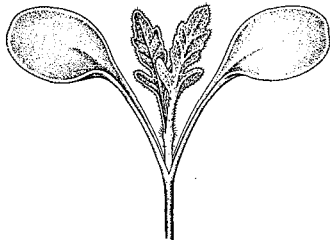
Giant ragweed (Kinghead)

Cotyledons—spread about 50 mm; broadly spatulate (spoon shaped) to oval, with broad petioles; triple veined at base on lower surface; midvein only on upper surface; thick and waxy; spotted on margin of lower surface

Leaves—opposite; three lobed, with terminal lobes toothed; branched midvein; petioles and leaves short, hairy

Hypocotyl—purple in color

Growth habit—annual



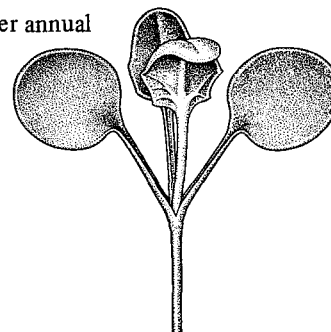
Pennycress

Cotyledons—spread about 19 mm; short oval, with long and slender petioles

Leaves—first leaves appear opposite, later alternate, several appearing together to form a rosette; short ovate to short oval, with toothed margins and long petioles; lightly branched midvein; garlic-like odor when crushed

Hypocotyl—short; smooth

Growth habit—annual or winter annual



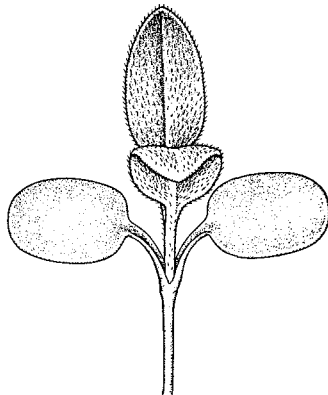
Marshelder

Cotyledons—spread about 11 mm; short oval, with broad petioles and blunt tips

Leaves—opposite; narrowly ovate, with pointed tips; branched midvein; leaves and petioles densely and coarsely hairy

Hypocotyl—often turns reddish

Growth habit—annual



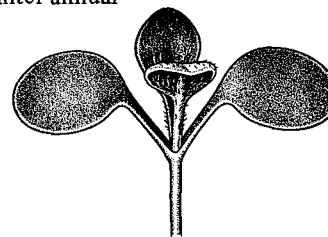
Shepherd's-purse

Cotyledons—spread about 10 mm; oval to ovate, with medium-long petioles; midvein none to faint on lower surface

Leaves—first leaves appear opposite, later alternate, becoming a rosette; oval to ovate; midvein on lower surface; hairy

Hypocotyl—short

Growth habit—annual or winter annual



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