

P I G W E E D

IDENTIFICATION

A Pictorial Guide to the Common Pigweeds of the Great Plains

Several pigweed species are found in the Great Plains. Pigweeds commonly reduce crop yields and

interfere with harvest. One means of controlling these weeds is through the use of herbicides. Recent research indicates that some pigweed species respond differently to various herbicides; therefore, proper identification is needed for good control.

Pigweed identification can be difficult, especially in the early stages of seedling growth as many species look the same. Once mature, identification is less difficult but not altogether straight forward. Key features of seedling and mature plants that aid in distinguishing the pigweed species are presented in this guide. However, it is important to note that “typical” plants of each species are shown, and that variation in shape and form exists within each species. Furthermore, some pigweed species may cross to produce hybrids. These hybrid plants may exhibit characteristics of both parents.

A generalized distribution map; photographs of seed, seedling, and mature plants; and text describing other identifying features are presented for each species. The species are grouped with others that have similar shape and form.

- ▶ redroot pigweed
- ▶ smooth pigweed
- ▶ Powell amaranth

- ▶ spiny amaranth
- ▶ tumble pigweed
- ▶ prostrate pigweed

- ▶ common waterhemp
- ▶ tall waterhemp
- ▶ Palmer amaranth



Kansas State University
Agricultural Experiment Station
and Cooperative Extension Service

Redroot pigweed (*Amaranthus retroflexus*)



1

SEED (photo 1)

- When seeds are threshed, sepals are curved outward, and about twice the length of the seed. Sepals usually have rounded tips.



2

IMMATURE (photos 2 and 3)

- Very small fine hairs are found throughout plant.
- Leaf and stem surfaces are rough.
- First leaves are rounded.
- Redroot pigweed is very similar to smooth pigweed and Powell amaranth.
- Redroot pigweed has a more rounded first leaf than Powell amaranth.
- Readily distinguished from smooth pigweed only when mature.



3

MATURE (photo 4)

- Very small fine hairs are found throughout plant.
- Flowering structure is highly branched.
- Male and female flowers on same plant.
- Branches of the flowering structure are very compact, usually less than 2 inches long, and thicker than a pencil.



4

2



Smooth pigweed

(*Amaranthus hybridus*)

SEED (photo 1)

- When seed are threshed, sepals are about the same length as the seed. Sepals have rounded tips.



1

IMMATURE (photos 2 and 3)

- Very small fine hairs are found throughout plant.
- Leaf and stem surfaces are rough.
- First leaves are rounded.
- Smooth pigweed is very similar to redroot pigweed and Powell amaranth.
- Smooth pigweed has a more rounded first leaf than Powell amaranth.
- Readily distinguished from redroot pigweed only when mature.



2

MATURE (photo 4)

- Very small fine hairs are found throughout plant.
- Flowering structure is highly branched, more so than redroot pigweed or Powell amaranth.
- Male and female flowers on same plant.
- Branches of the flowering structure are compact, usually more than 1½ inches long, and thinner than a pencil. Branches are usually longer than those of redroot pigweed.
- At maturity, entire plant and flowering structure are usually either green or reddish purple.



3



4

Powell amaranth (*Amaranthus powellii*)



1

SEED (photo 1)

- When seeds are threshed, sepals are straight, longer than the seed, and pointed. One sepal is usually noticeably longer than the others.



2

IMMATURE (photos 2 and 3)

- Very small fine hairs are found throughout the plant.
- Leaf and stem surfaces are rough.
- Powell amaranth is very similar to redroot pigweed and smooth pigweed.
- First leaves are more tapered and slightly pinched toward the end, unlike redroot and smooth pigweed.



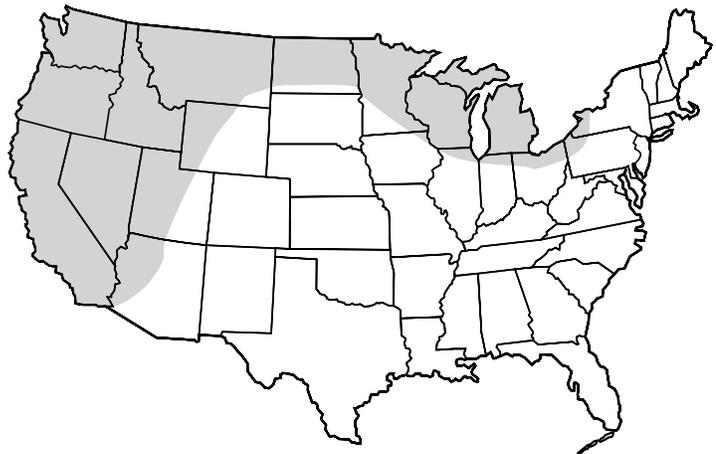
3

MATURE (photo 4)

- Very small fine hairs are found throughout plant.
- Flowering structure is branched, but less than redroot pigweed and much less than smooth pigweed.
- Male and female flowers on same plant.
- Branches of the flowering structure are usually 4 to 8 inches long, and thicker than a pencil.



4



Spiny amaranth

(*Amaranthus spinosus*)

SEED (photo 1)

- When seed are threshed, sepals are slightly longer than the seed.
- The seed capsule breaks irregularly.



1

IMMATURE (photos 2 and 3)

- Sharp spines are present at points of leaf attachment to stems (nodes).
- The leaves often have a v-shaped variegation.
- Stems are smooth and do not have hairs.



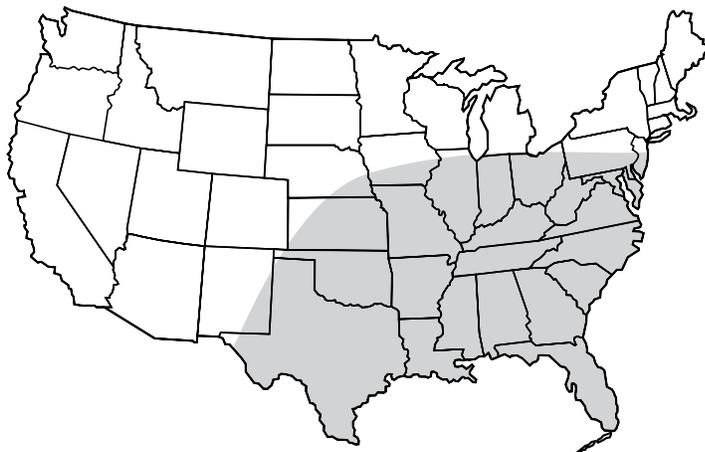
2

MATURE (photo 4)

- Sharp spines are present in the leaf nodes and flowering clusters.
- Plant often has a nodding appearance.
- The leaves often have a v-shaped variegation.
- Stems are smooth and do not have hairs.
- Female flowers toward bottom and middle of plant, with spines in the flower clusters.
- Male flowers at tops of plants.



3



4

Tumble pigweed

(*Amaranthus albus*)



1

SEED (photo 1)

- When seed are threshed sepals are slightly longer than the seed.
- The seed capsule breaks apart into two cup-like sections.



2

IMMATURE (photos 2 and 3)

- Leaves are egg shaped with wavy edges.
- Plant is often an olive green color.
- Leaves are small, usually less than 1½ inches long.



3

MATURE (photo 4)

- Plants are 2 to 3 feet tall and often spherical in shape.
- Leaves are egg-shaped with wavy edges.
- Leaves are small, usually less than 1½ inches long.
- There is no distinct flowering structure; flowers are located at points of leaf attachment to the stem.
- At maturity, plant may break off at ground level and roll.



4



Prostrate pigweed

(*Amaranthus blitoides*)

SEED (photo 1)

- Seed are larger than those of the other pigweed species.
- Sepals longer than seed.
- When threshed seed capsule breaks apart into two cup-like sections.



1

IMMATURE (photos 2 and 3)

- Cotyledons are longer than other pigweed species.
- Plant is low growing and prostrate.
- Leaves are spatulate.
- Leaves are small, usually less than 1½ inches long.



2

MATURE (photo 4)

- Plant is low growing and spreading.
- Leaves are waxy, spatulate and narrow toward the base.
- Leaves are small, usually less than 1½ inches long.
- There is no distinct flowering structure; flowers are located at points of leaf attachment to the stem.



3



4

Waterhemp (common and tall) (*Amaranthus rudis*, *A. tuberculatus*)



1



3



4



5



2

Distinguishable only when flowers or seed are present.

SEED

(photos 1 and 2)

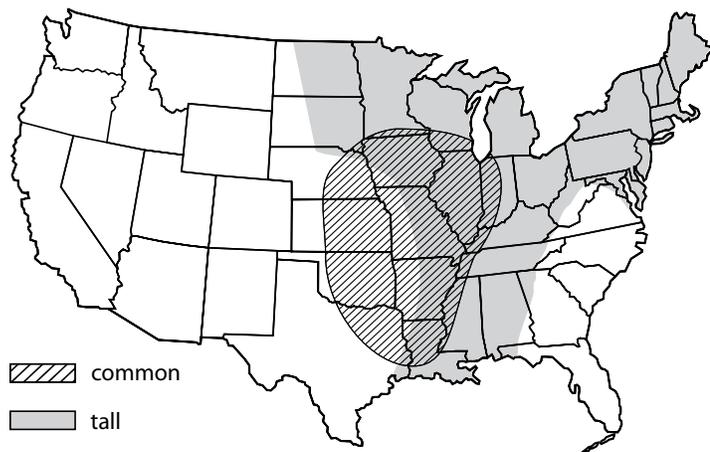
- When threshed, many seed remain in capsule (utricle).
- If the seed capsule breaks apart into two cup-like sections, it is common waterhemp (photo 1); if the capsule breaks irregularly when threshed, it is tall waterhemp (photo 2).
- Common waterhemp usually has a discernible fracture line on the capsule (photo 1).

IMMATURE (photos 3 and 4)

- Cotyledons are often more egg shaped than other species.
- Waterhemp has long narrow leaves (lanceolate), which are often waxy in appearance. Note: leaf shape is extremely variable in these species.
- There are no hairs on the plant.
- Stem and leaf surfaces are smooth.

MATURE (photo 5)

- Leaves are usually long and narrow (variable).
- Each plant is either male or female. Males shed pollen, while females produce seed.
- Flowering structures are open and located near the top of the plant and at the tips of branches.
- Stem and leaf surfaces are smooth.



Palmer amaranth

(*Amaranthus palmeri*)

SEED (photo 1)

- When seed are threshed, sepals are about twice the length of the seed. The seed capsule breaks apart into two cup-like sections.



1

IMMATURE (photos 2, 3, and 4)

- There are few or no hairs on this species, stem and leaf surfaces are smooth (distinguishes Palmer amaranth from redroot pigweed, smooth pigweed and Powell amaranth).
- The petioles are often as long or longer than the leaf blades.
- Plant often has a poinsettia-like appearance with symmetrical leaf arrangement.
- The leaves occasionally have a v-shaped variegation.



2



3



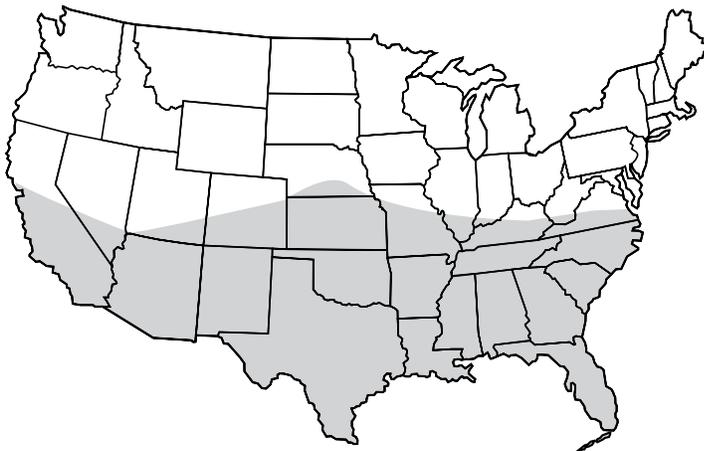
4

MATURE (photo 5)

- Flowering structure is 1 to 2 feet long, thick, and mostly non-branched.
- Each plant is either male or female; male flowering structure feels soft and sheds pollen, while female flowering structure feels prickly and contains seed.
- Leaves occasionally have a v-shaped variegation, but plants do not have spines.
- The petioles are as long or longer than the leaf blade.
- There are no hairs on the plant.
- Stem and leaf surfaces are smooth.



5



Mature plant identification key

This key can be used to distinguish between pigweed species. Based on the flowering characteristics you observe, choose between the alternatives listed with the number "1." Then proceed to the next set of alternatives under the selected heading. Again, choose the appropriate alternatives and continue the process until the pigweed is identified.

1. Flowering structures are located throughout the plant.
No terminal structures.
 2. Plant low growing spreading across ground -----> prostrate pigweed
 2. Plant erect, usually less than 3 feet tall, often round in shape-----> tumble pigweed
1. Flowering structures primarily at the tips of branches or toward the top of the plant.
 3. Plant with ½ inch or longer spines (usually paired) at the point of leaf attachment to stem and the flower clusters.-----> spiny amaranth
 3. Plants without spines throughout plant.
(Note: Palmer amaranth female flower structures feel prickly but lack spines at leaf nodes.)
 4. Plants with very fine hairs on stems.
 5. Compact flowering structure, branches of flowering structure are thick, short (less than 2 inches) and stubby; sepals curved outward with round tips, 2 times the length of the seed -----> redroot pigweed
 5. Compact flowering structure, branches of flowering structure are moderate in length (usually 1½ to 3 inches), about pencil thickness or less in diameter. Sepal tips are rounded and same length as seed -----> smooth pigweed
 5. Compact flowering structure, branches of flowering structure thick, long (often 4 to 8 inches); sepals are straight, pointed and longer than seed -----> Powell amaranth

4. Plants with smooth stems, without fine hairs.

6. Leaves on long petioles — often the length of the leaf blade, wide leaves (often poinsettia like appearance); flowering structure usually unbranched on thick stalks, very long (1 to 2 feet) at top of the plant and shorter on the branches. Female plants bear seeds and have prickly flowering structure. -----

▶ Palmer amaranth

6. Leaves usually narrow - sometimes waxy in appearance; flowering structure at top of plant and at the end of branches, branches of the flowering structure are usually thinner than a pencil.

7. Capsule enclosing seed breaks into two cup-like structures -----

▶ common waterhemp

7. Capsule enclosing seed, breaks irregularly when threshed -----

▶ tall waterhemp

M.J. Horak Kansas State University
D.E. Peterson Kansas State University
D.J. Chessman Kansas State University
L.M. Wax USDA-ARS, Urbana, IL

Acknowledgments

We acknowledge American Cyanamid and DuPont for partial support of this project.