Wildflowers have two cotyledons (and hence are called dicots), even for species that have grass-like foliage. Cotyledons are the "seed leaves", and they function as primary leaves (that is, the first photosynthetic leaves) and/or as storage organs to provide food to the germinating seedling until the first true leaves emerge. Grasses are monocots so they have a single cotyledon. However, the grass cotyledon is not visible in the germinating seedling as the cotyledon serves a digestive function that results in food being provided to the germinating seedling until the first true leaf emerges.

Dicot cotyledons are not always visible. In some species, the cotyledons remain below ground level, which is called hypogeal germination. In many cases, including all the species in this report, the cotyledons are visible as they emerge above the soil to become the first photosynthetic organ of the seedling. This type of germination is termed epigeal.

When trying to identify emerging seedlings, consider the following:

1. Cotyledon shape and size do not necessarily correspond to the seed shape and size; cotyledon shape and size are a reflection of the embryo.
2. Dicots with grass-like foliage have two cotyledons. The first true leaves of such wildflowers may resemble grass seedlings (for example, Liatris).
3. Seedlings at the "first true leaf" stage are most easily identified using a 10X to 20X hand magnifier.
4. The first true leaves of many species have sparse to dense hairs; hairs are most easily seen if backlit and/or magnified (Figure 1, page 2).
5. Seedlings tend to be elongated in low light.
6. Sometimes the seed coat may cling to a cotyledon (Figure 1, page 2).
7. Under field conditions, to help determine if wildflowers or grasses have germinated and emerged, sow a small portion of seeds in an identifiable pattern, like an X; however minimize disturbance of the soil so as to reduce the number of weeds that could germinate in that same pattern.
8. The shape and size of dicot cotyledons and first true leaves are useful identification characteristics (Figures 2 and 3, pages 3 and 4, respectively). In this report, a penny is included in most images to provide size perspective.

Figure 1. *Helianthus debilis* seedling – note the hairs (trichomes) on the first true leaves, and the seed coat attached to the cotyledon. Also note that the shape of the seed does not resemble the shape of the cotyledon.
Figures on pages 3 and 4 are from a Texas A&M University extension publication:

Baumann, Paul A. 1999. Weed identification: using plant structures as a key. Texas Agricultural Extension System Publication B-6079. Texas A&M University, College Station, TX.
http://www.cnr.uidaho.edu/range351/TAMU-Plant-Parts-Guide.pdf

Figure 2. Basic cotyledon shapes, which can aid in identifying seedlings of broadleaf species (Baumann, 1999).
Figure 3. Basic leaf shapes, which can aid in identifying seedlings of broadleaf species (Baumann, 1999).
<table>
<thead>
<tr>
<th>Latin name</th>
<th>Common name</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ageratina jucunda</td>
<td>Hammock Snakeroot</td>
<td>6</td>
</tr>
<tr>
<td>Berlandiera subacaulis</td>
<td>Florida Greeneyes</td>
<td>8</td>
</tr>
<tr>
<td>Bidens mitis</td>
<td>Smallfruit Beggarticks</td>
<td>10</td>
</tr>
<tr>
<td>Conoclinium coelestinum</td>
<td>Blue Mistflower, Wild Ageratum</td>
<td>12</td>
</tr>
<tr>
<td>Coreopsis basalis</td>
<td>Goldenmane Tickseed</td>
<td>13</td>
</tr>
<tr>
<td>Coreopsis lanceolata</td>
<td>Lanceleaf Tickseed</td>
<td>15</td>
</tr>
<tr>
<td>Coreopsis leavenworthii</td>
<td>Leavenworth's Tickseed</td>
<td>17</td>
</tr>
<tr>
<td>Echinacea purpurea</td>
<td>Purple Coneflower</td>
<td>19</td>
</tr>
<tr>
<td>Eragrostis elliottii</td>
<td>Elliott's Lovegrass</td>
<td>23</td>
</tr>
<tr>
<td>Eragrostis spectabilis</td>
<td>Purple Lovegrass</td>
<td>26</td>
</tr>
<tr>
<td>Flaveria linearis</td>
<td>Narrowleaf Yellowtops</td>
<td>29</td>
</tr>
<tr>
<td>Gaillardia pulchella</td>
<td>Blanketflower, Indian Blanket</td>
<td>31</td>
</tr>
<tr>
<td>Helianthus debilis</td>
<td>Beach Sunflower, East Coast Dune Sunflower</td>
<td>33</td>
</tr>
<tr>
<td>Ipomopsis rubra</td>
<td>Spanish Larkspur, Standing Cypress</td>
<td>35</td>
</tr>
<tr>
<td>Liatris gracilis</td>
<td>Slender Gayfeather</td>
<td>37</td>
</tr>
<tr>
<td>Liatris spicata</td>
<td>Dense Gayfeather</td>
<td>38</td>
</tr>
<tr>
<td>Mimosa strigillosa</td>
<td>Powderpuff</td>
<td>40</td>
</tr>
<tr>
<td>Phlox drummondii</td>
<td>Annual Phlox, Drummond Phlox</td>
<td>43</td>
</tr>
<tr>
<td>Rudbeckia hirta</td>
<td>Black-eyed Susan</td>
<td>45</td>
</tr>
<tr>
<td>Rudbeckia mollis</td>
<td>Softhair Coneflower</td>
<td>47</td>
</tr>
<tr>
<td>Scutellaria integrifolia</td>
<td>Helmet Skullcap</td>
<td>49</td>
</tr>
<tr>
<td>Trifolium reflexum</td>
<td>Buffalo Clover</td>
<td>51</td>
</tr>
<tr>
<td>Vernonia angustifolia</td>
<td>Tall Ironweed</td>
<td>54</td>
</tr>
<tr>
<td>Vernonia gigantea</td>
<td>Giant Ironweed</td>
<td>55</td>
</tr>
</tbody>
</table>
**Ageratina jucunda**

Hammock Snakeroot
USDA Symbol: AGJU2

**ID Notes:**
1. Cotyledons – ovate, with truncate (flattened) apex
2. First true leaves – ovate; leaf margins coarsely serrated; sparsely pubescent (short, fine hairs); petiole sparsely pubescent like leaf

See next page for size perspective
Berlandiera subacaulis
Florida Greeneyes
USDA Symbol: BESU

ID Notes:
1. Cotyledons – oval
2. First true leaf – densely pubescent, as is petiole; pronounced mid-rib vein
3. Second true leaf (see next page) – much larger than first true leaf; pubescent; irregular crenate margin (coarse, rounded teeth)

See next page for size perspective
Bidens mitis
Smallfruit Beggarticks
USDA Symbol: BIMI

ID Notes:
1. Cotyledons – oval
2. First true leaves – one main lobe, plus one to two small lobes; resembles sassafras
3. Hairs on main stem but sparse on petiole (see next page)
*Conoclinium coelestinum* (formerly *Eupatorium coelestinum*)

Blue Mistflower, Wild Ageratum

USDA Symbol: COCO13

**ID Notes:**
1. Cotyledons – round
2. First true leaves – ovate; sparsely pubescent (short hairs)
3. Very small seedling
Coreopsis basalis
Goldenmane Tickseed
USDA Symbol: COBA2

ID Notes:
1. Cotyledons – oval
2. First true leaves – ovate; pubescent (coarse hairs), as is petiole
3. Seedlings tend to be light green

See next page for size perspective
Coreopsis lanceolata
Lanceleaf Tickseed
USDA Symbol: COLA5

ID Notes:
1. Cotyledon – spatulate
2. First true leaves – spatulate to broadly lanceolate; sparsely pubescent (coarse hairs)
3. Second set of leaves – spatulate to lanceolate, with long petiole; glabrous, or nearly so
Coreopsis leavenworthii
Leavenworth's Tickseed
USDA Symbol: COLE3

ID Notes:
1. Cotyledons – oval to spatulate
2. First true leaves – obovate; glabrous
**Echinacea purpurea**
Purple Coneflower
USDA Symbol: ECPU

**ID Notes:**
1. Cotyledon – round to oval, with truncated apex
2. First true leaves – obovateolate to ovate; sparsely pubescent but margins more densely pubescent; petiole sparsely pubescent
*Eragrostis elliottii*

Elliott's Lovegrass

USDA Symbol: EREL

ID Notes:

1. First true leaf – margins rolled slightly inward, especially when first emerging; very fine teeth along margin; during first 1-2 weeks after emergence, usually up to twice as tall as *Eragrostis spectabilis* seedlings
Eragrostis spectabilis
Purple Lovegrass
USDA Symbol: ERSP

ID Notes:
1. First true leaf – margin rolled slightly inward when first emerging; very fine teeth along margin; during first 1-2 weeks after emergence, usually about half as tall as Eragrostis elliottii seedlings
*Flaveria linearis*

Narrowleaf Yellowtops  
USDA Symbol: FLLI

**ID Notes:**  
1. Cotyledons – oval to round  
2. First true leaves – linear and bluntly tipped when small; gradually becoming more lanceolate; glabrous
**Gaillardia pulchella**
Blanketflower, Indian Blanket
USDA Symbol: GAPU

**ID Notes:**
1. Cotyledons – oval to spatulate
2. First true leaves – lanceolate; moderately to densely pubescent (long, soft hairs), including petiole
**Helianthus debilis**
Beach Sunflower, East Coast Dune Sunflower
USDA Symbol: HEDE4

ID Notes:
1. Cotyledons – round, and often kidney shaped (round with shallow notch)
2. First true leaves – lanceolate to oblong to ovate; moderately pubescent (coarse hairs)
Ipomopsis rubra
Spanish Larkspur, Standing Cypress
USDA Symbol: IPRU2
ID Notes:
1. Cotyledons – linear, very small; might be able to distinguish these seedlings at this stage
2. First true leaves – 2-3 pointed, finger-like lobes; one lobe much larger; if 3 lobes, center lobe the largest; petioles sparsely pubescent (coarse hairs)
**Liatris gracilis**
Slender Gayfeather
USDA Symbol: LIGR9

**ID Notes:**
1. Cotyledons – spatulate, with truncated apex; glossy
2. First true leaf – narrowly linear (grass-like) and noticeably revolute (margins curled downward) when first emerging; prominent midvein; blunt tip; glabrous
**Liatris spicata**  
Dense Gayfeather  
USDA Symbol: LISP  

**ID Notes:**  
1. Cotyledons – spatulate, with truncated apex; glossy; slightly larger than those of *L. gracilis*  
2. First true leaf – narrowly linear (grass-like) and noticeably revolute (margins curled downward) when first emerging; prominent midvein; blunt tip; glabrous
Mimosa strigillosa
Powderpuff
USDA Symbol: MIST2
ID Notes:
1. Cotyledons – oval
2. First true leaves – newly emerging leaf is perpendicular to petiole; pinnately compound; 8 to 10 leaflets; leaflets broadly obovate and nonsymmetrical; main vein ends in pointed tip
3. Scarified seeds might germinate in less than 2 days
*Phlox drummondii*
Annual Phlox, Drummond Phlox
USDA Symbol: PHDR

**ID Notes:**
1. Cotyledons – broadly lanceolate
2. First true leaves – linear, with short, spine-like tip, becoming lanceolate to oblanceolate; sparsely pubescent, as are petioles
**Rudbeckia hirta**

Black-eyed Susan  
USDA Symbol: RUHI2

**ID Notes:**
1. Cotyledons – oval to round, with truncated apex
2. First true leaves – ovate to oblanceolate to spatulate; moderately pubescent (coarse hairs) as are petioles
Rudbeckia mollis
Softhair Coneflower
USDA Symbol: RUMO

ID Notes:
1. Cotyledons – round; frequently kidney shaped
2. First true leaves – round to broadly ovate; densely pubescent (soft hairs) as are petioles

*NOTE: Image was edited to highlight pubescence. The image on p. 48 accurately depicts seedling color.
Scutellaria integrifolia
Helmet Skullcap
USDA Symbol: SCIN2

ID Notes:
1. Cotyledons – round to kidney shaped; moderately pubescent (short hairs)
2. First true leaves – oblong; moderately pubescent (short hairs), as are petioles; margins slightly serrated
3. Subsequent leaves – moderately pubescent (short hairs), as are petioles; margins crenate (shallow, rounded teeth) – see next page
Trifolium reflexum
Buffalo Clover
USDA Symbol: TRRE2

ID Notes:
1. Cotyledons – broadly oblong to oval
2. First true leaf – round, with notched tip (like a kidney shaped cotyledon – Figure 2, page 3); margin ciliate (fine hairs)
3. Second true leaf – trifoliate, with reverse cordate leaflets (leaflets attached at point of heart); margins ciliate
**Vernonia angustifolia**
Tall Ironweed
USDA Symbol: VEAN

**ID Notes:**
1. Cotyledons – broadly oblong, with shallowly-notched truncate apex
2. First true leaves – ovate; moderately pubescent dense (short, fine hairs)
Vernonia gigantea
Giant Ironweed
USDA Symbol: VEGI

ID Notes:
1. Cotyledons – round, with truncate apex
2. First true leaves – "ovate" but lower half can be more angular than gently curved as in typical ovate shaped leaf; moderately pubescent (short, fine hairs)