Amaranthus, Millets, Forage Legumes, Spinach, and Miscellaneous Umbelliferae

David M. Brenner, and Samuel N. Flomo, North Central Regional Plant Introduction Station

Collection Description

Our 8,666 accessions represent 68 genera. Amaranthus is our largest genus. Amaranthus also gets more seed orders than our other genera. Our most commercially important genus is Spinacia (spinach). The 68 genera are in six plant families.

<table>
<thead>
<tr>
<th>Families</th>
<th>Genera</th>
<th>Accessions</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amaranthaceae</td>
<td>5</td>
<td>3,385</td>
<td>Mostly Amaranthus and Celosia</td>
</tr>
<tr>
<td>Apiaceae</td>
<td>41</td>
<td>1,070</td>
<td>Mostly Anethum, Coriandrum, and Petroselinum</td>
</tr>
<tr>
<td>Chenopodiaceae</td>
<td>4</td>
<td>635</td>
<td>Mostly Chenopodium and Spinacia</td>
</tr>
<tr>
<td>Fabaceae</td>
<td>7</td>
<td>1,179</td>
<td>Mostly Medicago</td>
</tr>
<tr>
<td>Lamiaceae</td>
<td>1</td>
<td>23</td>
<td>The mint family includes Perilla</td>
</tr>
<tr>
<td>Poaceae</td>
<td>10</td>
<td>2,375</td>
<td>The grass family includes the millets</td>
</tr>
</tbody>
</table>

Crop Uses

Amaranthus white seeded grain, vegetable, and ornamental
Chenopodium grain
Celosia ornamental, and vegetable
Echinochloa grain and fodder
Melilotus forage, and soil improvement
Panicum grain, and bird food
Perilla clover, vegetable, food, pigments, ornamental
Apiaceae spice seeds, vegetables, ornamentals
Sedaria grain, and bird food
Spinacia vegetable

Impact

Our germplasm supports research projects worldwide. It is often used for pilot studies of crop adaptation. The spinach germplasm collection is a resource used since the 1940’s to discover resistance to newly evolving forms of blue mold disease.

We anticipate advances in plant breeding by identifying useful traits such as male sterility and non-shattering seed cases.

In Amaranthus, Chenopodium, and Sedaria the collection is the basis for research publications improving the understanding of systematics and taxonomy.

Five improved lines of Amaranthus are available from Iowa State University from our enhancement breeding. All of these have genes for non-shattering seed cases. Non-shattering is in two grain producing species used in health food niche markets. The non-shattering trait is in two ornamental lines where it prevents seeds from falling on to tables in cut flower use.

Management Challenges

The challenge for our group is to produce genetically clean seed stocks of a diverse set of out-crossing germplasm that is often not adapted here in Iowa. For example: Plastic tents in the winter greenhouse work well for Amaranthus, Chenopodium, and the millets: Echinochloa, Panicum, and Sedaria.

Our Melilotus transplanting protocol is timed to avoid the egg laying season of destructive insects.

Recent advances in breaking the dormancy of wild spinach seeds will allow us to improve seed production.

The methods we use continue to benefit from innovations. We are always seeking new ideas.

Selected References