1998

Daucus and Apiaceae in the USDA germplasm collection

Kathleen R. Reitsma
Iowa State University, kreitsma@iastate.edu

Mark P. Widrlechner
United States Department of Agriculture, isumw@iastate.edu

Umbelliferae Improvement Newsletter, 1998
Volume 8, pages 1-4

Daucus and Apiaceae in the USDA Germplasm Collection[1]

Kathleen R. Reitsma[2] and Mark P. Widrlechner[3], North Central Regional Plant Introduction Station, Iowa State University, Ames, Iowa 50011-1170 USA

The North Central Regional Plant Introduction Station (NCRPIS) is one of the primary active sites in the U. S. National Plant Germplasm System (NPGS). Nearly all of the NPGS's collections of Apiaceae, with the exception of *Apium* (celery), are conserved at the NCRPIS. The NCRPIS's Apiaceae germplasm is divided for management purposes into two groups, *Daucus* and Umbels, as shown in Table 1 and Table 2, respectively. The NCRPIS makes these germplasm samples available for research purposes at no cost to the user. Samples can be obtained by contacting the senior author at <kreitsma@iastate.edu>.

Daucus Germplasm at the NCRPIS

Regeneration. The *Daucus* collection includes accessions with annual, biennial, or mixed life cycles. Accessions are regenerated when the quantity of distribution lots drops below 5000. Seeds are sown in pots in the greenhouse in October, and plants are fertilized weekly until mid-February. In general, we use a population of 50 to 100 plants per accession. As annual plants bolt, they are separated from the biennial plants, hand pollinated in the greenhouse, and harvested when mature. Seeds from the annual plants are bulked with seeds harvested from the caged biennial plants before germination testing and storage.

Vernalization. During their last week in the greenhouse, biennial plants are not watered, foliage is trimmed to 3 cm above the crown, and pots are treated with fungicide to prevent *Botrytis* during vernalization. The pots are placed in a cool, dark room maintained at 4 - 7° C and 60 - 70% RH for 40 to 60 days. Roots are watered sparingly during this time and additional fungicide is applied if needed. About one week before expected field transplanting, roots are moved outside to a cold frame and watered so that plants develop new foliage.

Pollination. Plants are transplanted to the field in late April or early May into 1.5 x 1.5 x 6.1 m cages covered by a Lumite[4] mesh screen. House fly pupae and a nucleus hive containing a queen and about 4000 honey bees are introduced into each cage, beginning in June, as plants begin to flower (Wilson et al., 1991).

Harvest and seed processing. In autumn, mature dried umbels are clipped from plants using hand pruners, colleted in small-mesh nylon bags, and dried in a forced-air dryer at 28° C for 1 - 2 days.

---

[1] Journal Paper No. J- 18194 of the Iowa Agricultural and Home Economics Experiment Station, Ames, Iowa. Project No. 1018 and supported by Hatch Act and State of Iowa Funds.

[2] Curator III, Iowa State University, Department of Agronomy

[3] Acting Research Leader, USDA - Agricultural Research Service

[4] Mention of commercial brand names does not constitute an endorsement of any product by the U. S. Department of Agriculture or cooperating agencies.

Seeds are removed from the umbels by using a belt thresher. A Clipper[4] air-screen cleaner and an air column separator are used to remove immature seeds and plant debris. Any remaining low-quality seeds and impurities are removed by hand picking.

Germination and storage. Germination tests are performed on each seed lot following the Association of Official Seed Analysts (AOSA, 1995) rules for testing seeds for those species that have standards; modifications of germination rules are necessary for seeds exhibiting dormancy. Seed increases are inventoried and stored in 950 ml glass jars at 4° C and 25% RH. The standard distribution sample is 200 seeds per accession.

Umbel Germplasm at the NCRPIS

The thirty genera in the Umbel group include accessions with annual, biennial, perennial, and mixed life cycles. These genera include vegetables (e.g., parsnips), culinary herbs (e.g., parsley, dill, fennel, coriander), medicinals (e.g., *Ammi*, *Angelica*), and ornamentals (e.g., *Ammi*, *Astrodaucus*).

Half of the accessions in this group have been received within the last ten years, and few are now available for distribution. Because little is known about cultural practices for some of these genera, we generally follow regeneration protocols established for *Daucus* but are working to refine techniques to conserve germplasm in this diverse group.

References

Association of Official Seed Analysts. 1995. Rules for testing seeds. Journal of Seed Technology 16, revised edition.

Wilson, R.L., Widrlechner, M.P., Reitsma, K.R. 1991. Pollination methods for maintaining carrot germplasm collections. IBPGR-FAO Plant Genetic Resources Newsletter 85: 1-3.

Table 1. Accessions of *Daucus* held at the NCRPIS as of August 1998

Daucus species	Total Accessions	Available
D. aureus	10	1
D. broteri	2	0
D. capillifolius	1	0
D. carota	586	438
D. carota ssp. *carota*	4	2
D. carota ssp. *drepanensis*	3	1
D. carota ssp. *gadecaei*	1	1
D. carota ssp. *gummifer*	3	2
D. carota ssp. *maritimus*	1	0
D. carota ssp. *maximus*	7	2
D. carota ssp. *sativus*	55	53
D. carota var. *atrorubens*	2	2
D. crinitus	2	0
D. durieua	2	0
D. glochidatus	1	0
D. guttatus	2	1
D. littoralis	1	0
D. muricatus	3	2
D. pusillus	6	1
D. sp.	29	0
Total	721	506

Table 2. Accessions of Umbels held at the NCRPIS as of August 1998.

Taxonomy	Total Accessions	Available
Ammi	16	6
Anethum	81	6
Angelica	41	2
Astrantia	1	0
Astrodaucus	7	0
Bifora	21	0
Bunium	7	0
Carum	36	1
Caucalis	5	0
Chaerophyllum	36	0
Coriandrum	160	50
Crithmum	1	0
Cuminum	24	0
Dorema	1	0
Ducrosia	1	0
Eriocycla	1	0
Eryngium	42	1
Ferula	19	0
Foeniculum	59	6
Levisticum	5	0
Muretia	1	0
Pastinaca	73	12
Petroselinum	154	55
Pimpinella	49	8
Saposhnikovia	1	0
Scaligeria	3	0
Sium	8	0
Torilis	19	1
Trachymene	1	0
Trachyspermum	4	0
Unidentified genera	23	0
Total	900	148