

Management of Carrot Regeneration



Ulrike Lohwasser

Leibniz Institute of Plant Genetics and Crop Plant Research (IPK),
Genebank Dept., Gatersleben, Germany



The German Genebank in Gatersleben



Inventory	Total number of acc.	Cultivation/no of accessions
Cereals and Grasses	65,448	2,494
wheat	28,111	769
barley	23,245	771
rye	2,411	73
Legumes	28,066	1,436
beans (<i>Phaseolus</i>)	9,146	283
peas	5,295	180
Vegetable	18,794	2,556
tomatoes	3,544	90
onions	3,319	1,421
beet/ <i>Beta</i>	2,320	180
Oil/Fibreplants	7,998	928
rapeseed	2,472	134
flax	2,324	104
Medicine/Spice Plants	8,344	1,476
Mutants	1,771	266
Forage crops	11,786	1,410
forage grasses	10,441	1,115
Potatoes	6,060	2,991
Total	151,002	13,557



151,002 accessions

3,212 species

776 genera



Reference collections

415,888 herbarium sheets

100,096 seeds & fruits

52,249 cereal spikes



Genebank Information System (GBIS)



http://gbis.ipk-gatersleben.de/gbis_i/

Daucus Collection of IPK

<i>Daucus aureus</i> Desf.	1
<i>Daucus broteri</i> Ten.	3
<i>Daucus carota</i> L.	2
<i>Daucus carota</i> L. subsp. <i>azoricus</i> Franco	1
<i>Daucus carota</i> L. subsp. <i>carota</i>	104
<i>Daucus carota</i> L. subsp. <i>commutatus</i> (Paol.) Thell.	5
<i>Daucus carota</i> L. subsp. <i>drepanensis</i> (Arcang.) Heywood	1
<i>Daucus carota</i> L. subsp. <i>gadecei</i> (Rouy & E.G.Camus) Heywood	1
<i>Daucus carota</i> L. subsp. <i>gummifer</i> Hook.f.	3
<i>Daucus carota</i> L. subsp. <i>hispanicus</i> (Gouan) Thell.	2
<i>Daucus carota</i> L. subsp. <i>hispidus</i> (Arcang.) Heywood	4
<i>Daucus carota</i> L. subsp. <i>major</i> (Vis.) Arcang.	4
<i>Daucus carota</i> L. subsp. <i>maritimus</i> (Lam.) Batt.	2
<i>Daucus carota</i> L. subsp. <i>maximus</i> (Desf.) Ball.	22
<i>Daucus carota</i> L. subsp. <i>rupestris</i> (Guss.) Heywood	1
<i>Daucus carota</i> L. subsp. <i>sativus</i> (Hoffm.) Arcang.	326
<i>Daucus guttatus</i> Sibth. & Sm.	2
<i>Daucus halophilus</i> Brot.	1
<i>Daucus muricatus</i> L.	3
<i>Daucus syrticus</i> Murb.	1
<i>Daucus</i> sp.	4



- more than 20 ha field area for cultivation
- 170 small greenhouses for cross pollinators
- more than 3000 m² greenhouse area



Regeneration of cultivated carrots
(second year)
50 plants per accession



Regeneration of wild carrots

20-25 plants per accession

Descriptors for
wild and cultivated
Carrots

(Daucus carota L.)



IPGRI is a centre of the Consultative Group on International Agricultural Research (CGIAR)

Biodiversity Descriptor

Characterization

Descriptor for *Daucus* spp. (cultivated and wild)

31 traits in total, 12 agronomical + 19 morphological traits

Root skin pigmentation / colour






1=white

2=yellow

3=orange

4=red

5=purple

Notation	1	2	3	4	5
Modality	White	Yellow	Orange	Red	Purple
Illustration					

Outer core pigmentation / colour

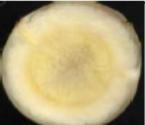
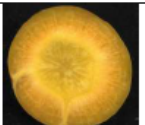



1=white

2=yellow

3=orange

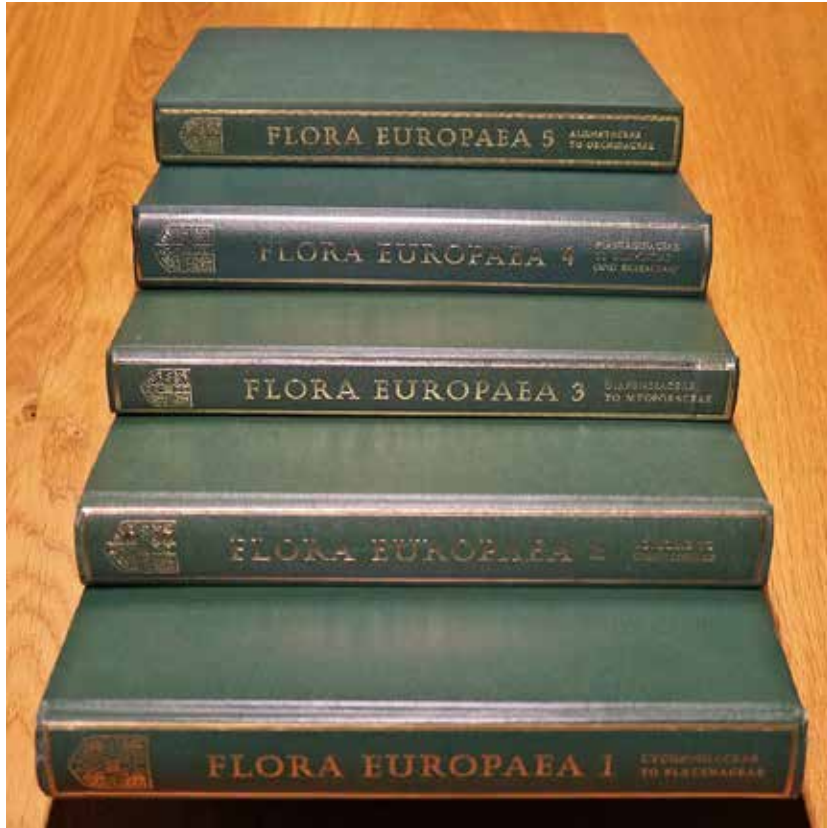
4=red

5=purple

Notation	1	2	3	4	5
Modality	White	Yellow	Orange	Red	Purple
Illustration					

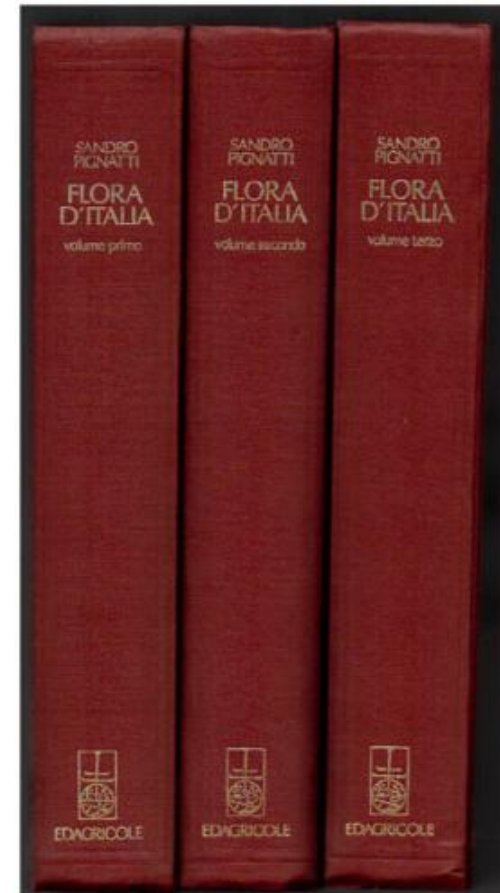
Taxonomical Determination

Flora Europaea



Source:
https://www.google.de/search?q=flora+europaea&client=firefox-b&source=lnms&tbn=isch&sa=X&ved=0ahUKEwiGuJTLnOXUAhWNYIAKHfloBI8Q_AUIDCgD&biw=1536&bih=806#imgsrc=MdgTzh5s0o3v9M

Flora D'Italia



Source:
https://www.google.de/search?q=pignatti+flora+italiana&client=firefox-b&source=lnms&tbn=isch&sa=X&ved=0ahUKEwjA26PfeXUAhWMLVAKH a9IAqUO_AUICgB&biw=1536&bih=806#imgsrc=89nxNMKmdjm3cM

Seed Storage



Cold Storage
at -18°C ; seed humidity $< 10\%$ (ca. 7%)

Svalbard Global Seed Vault



Svalbard Image Gallery (<http://www.croptrust.org/main/arctic.php?itemid=217>)



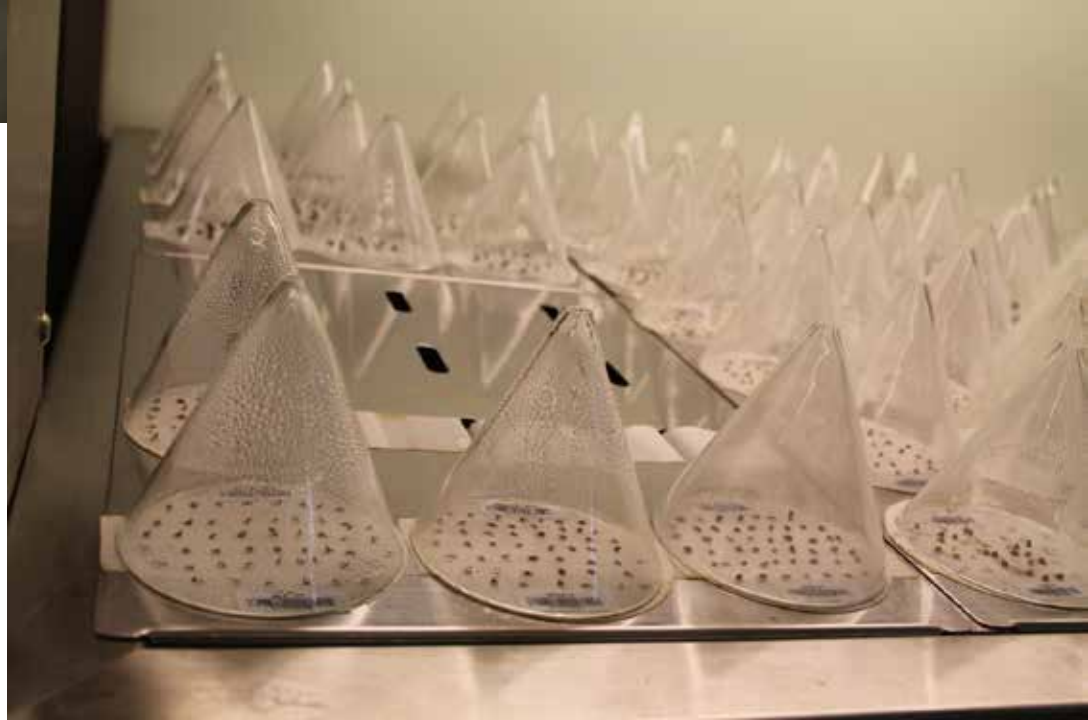
**Storage of safety
duplicates
of the German
genebank
48,655 accessions**



Germination Test



Jacobsen Apparatus





50 seeds per accession (DAU 66 – *Daucus carota* subsp. *sativus*)



DAU 66 / 2010



27312296

26.06.17



27312296

After 4 days

ISTA Regulations

Daucus carota

TP (top of paper), BP (between paper)

Temperature: 20-30 °C

Begin of counting after 7 days

End of counting after 14 days

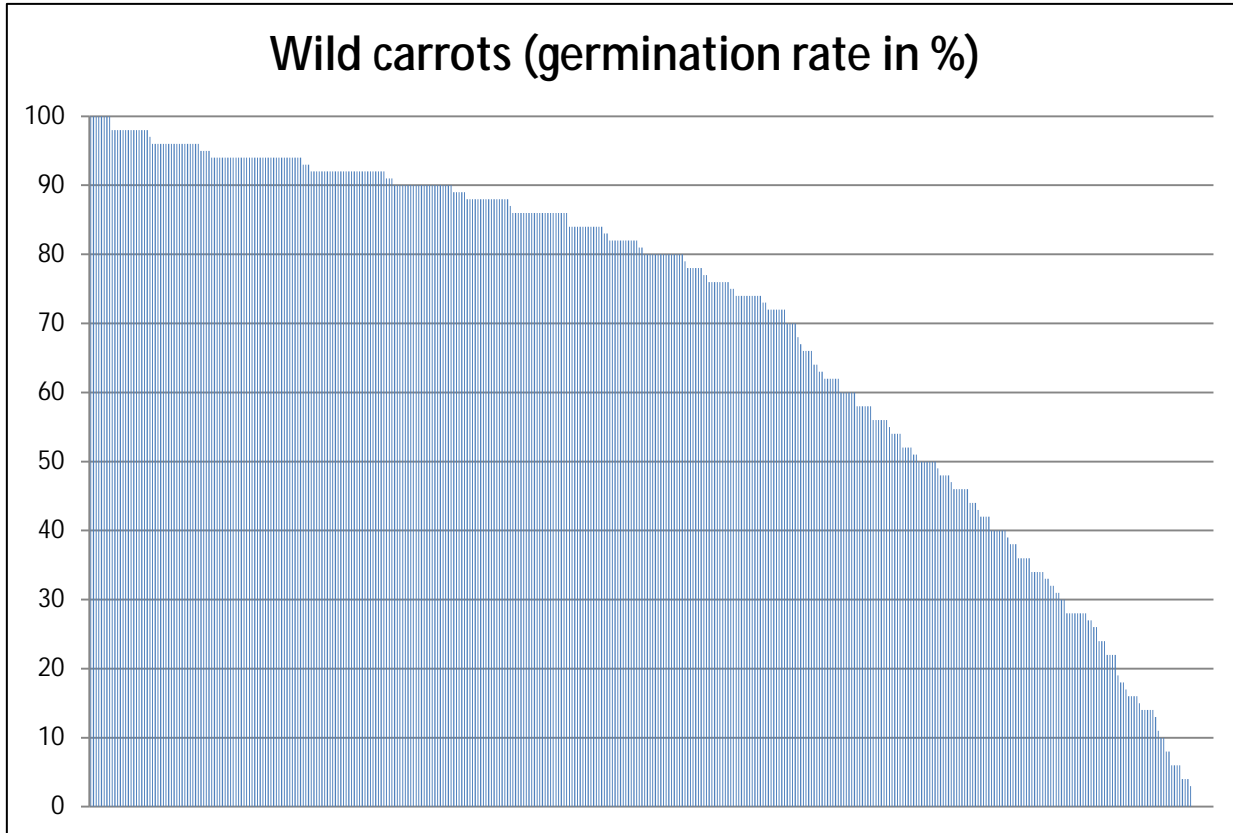
no remarks

Seed Longevity

Under ambient conditions: 4-6 years

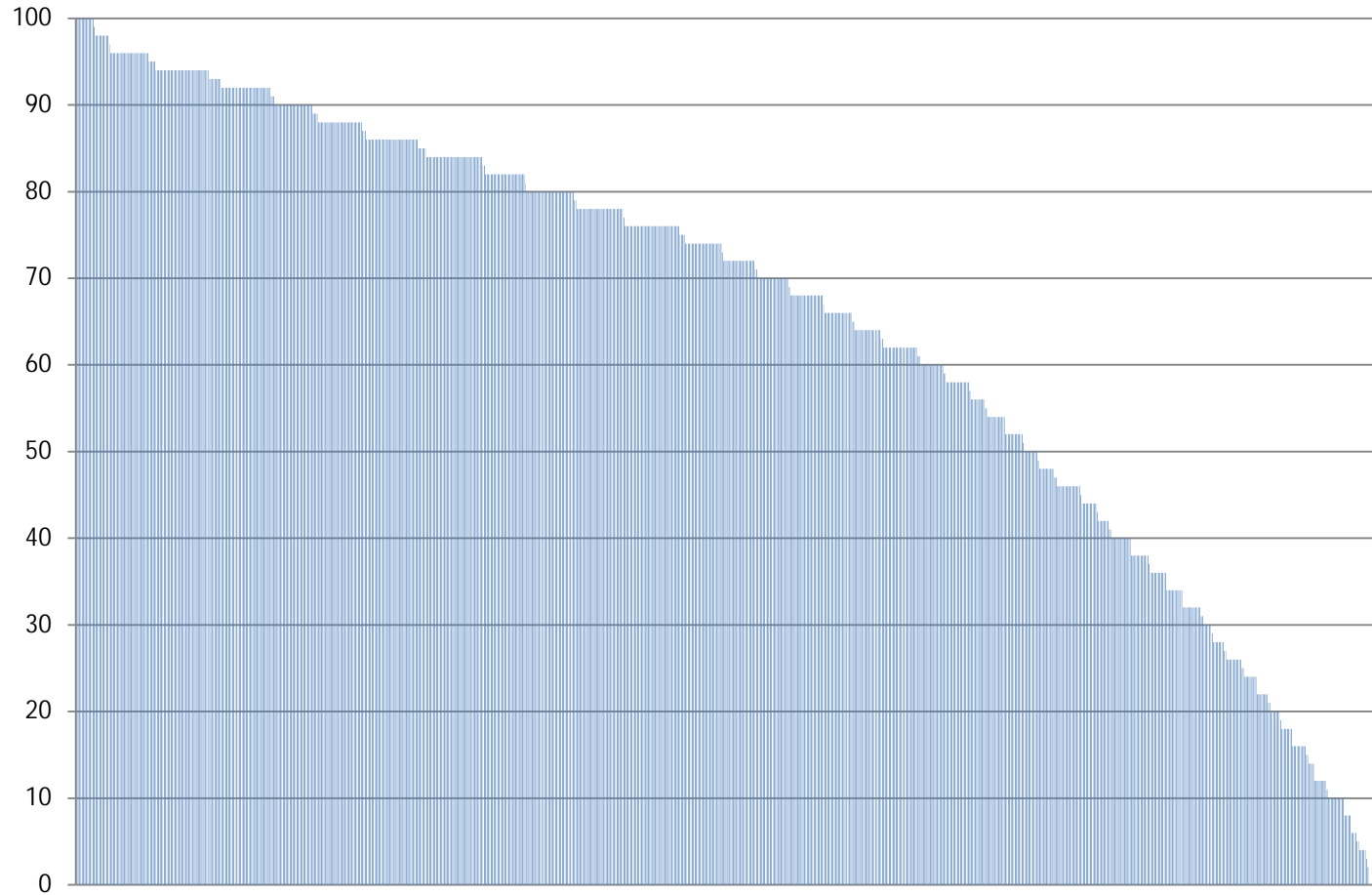
Under optimal conditions (-18 °C, 5-8% rH): 20-25 years

Germination Data



Germination Data

Cultivated carrots (germination rate in %)



Thank you very much for your attention!

