

Seed Cleaning & Testing

GBNPSIP

February 2008

FS National Seed Laboratory

Vacuum line to collect dust

Westrup Brush Machine

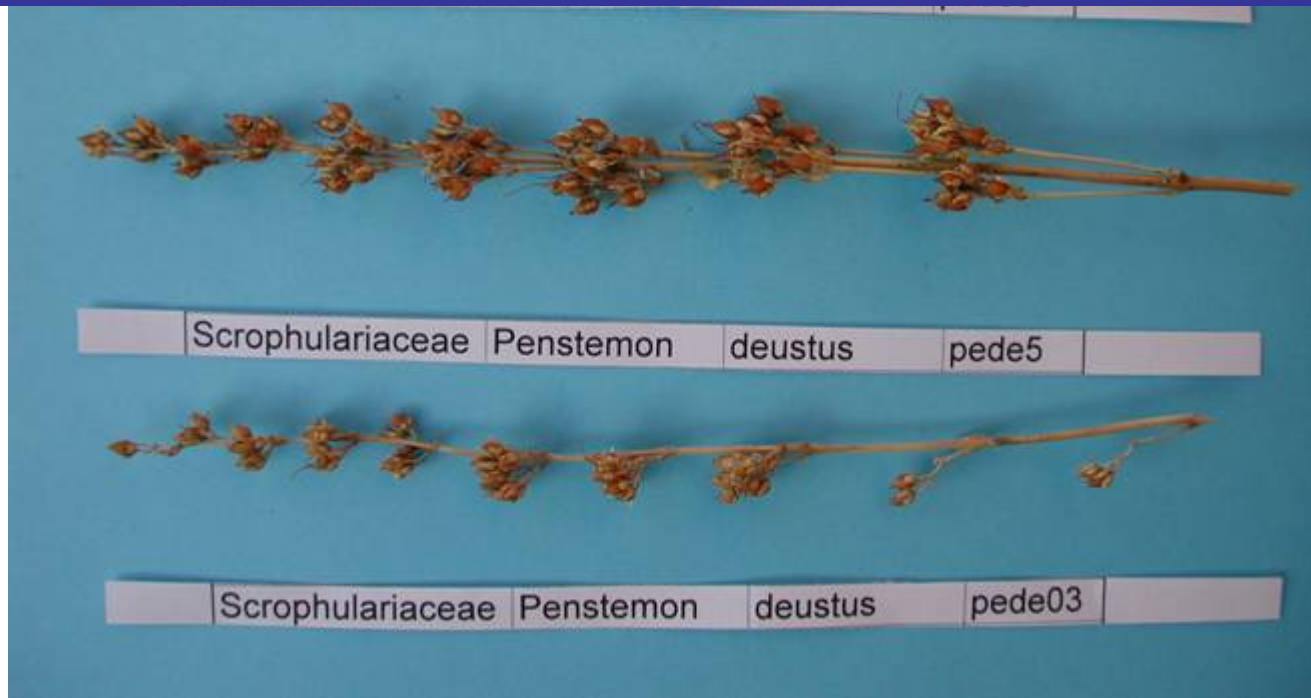
Extracts seeds from
fruits and makes seeds
flowable

Turning brushes rub seeds
Against the shell (wire screen)

Wire
shell

The machine is
open for
demonstration

Penstemons required courser
shell #10 and higher
speed (9 on a 1-12 scale)



↑ 38 x 38

↓ 34 x 34

heavy

~~gentle~~

~~45 on~~
~~low~~
~~low~~



Agoseris glauca (pale agoseris)
rough seed before
extraction and singularization in the
brush machine

Grass seed found when scalping trash from Agoseris seed

Contaminating
grass seeds

Agoseris
seeds



Cleaning seeds to high purity helps
find these contaminants

Species	Extraction machine	Scalping Screens	Sieving Screens	Aspirator pressure	Blower pressure
<i>Agoserus glauca</i> Pale agoserus	B19 S 3	6 rd	6 x 20	.02	1.0
<i>Astragalus filipes</i> Basalt milkvetch	Tumbler	7.5 rd	14 x 14	.04	n/a
<i>Balsamorhiza sagitta</i> Arrowleaf balsomroot	Tumbler	8 rd	6 x 9	.04	1.0
<i>Crepis acuminata</i> Tapertip hawksbeard	B19 S3	8 rd	1/23	.01	n/a
<i>Eriogonum heracleoides</i> Parsnipflower buckwheat	B19 S2	8 rd	6 x 30	.02	n/a
<i>Eriogonum umbellatum</i> Sulfurflower buckwheat	B19 S2	8 rd	n/a	.04	n/a
<i>Lomatium distichum</i> Fernleaf biscuitroot	B19 S2	22rd	n/a	.02	1.0
<i>Lomatium grayi</i> Gray biscuitroot	B19 S2	22 rd	n/a	.02	1.0
<i>Lomatium triternatum</i> Nineleaf biscuitroot	B19 S2	22 rd	n/a	.02	1.0
<i>Penstemon acuminatus</i> Sand penstemon	B10 S6	20 rd 6.5 rd	n/a	.04	n/a
<i>Penstemon deustus</i> Scabland penstemon	B10 S9	20 rd 20 x 20	n/a	.04	1.0
<i>Sphaeralcea munroana</i> Munro's globemallow	B19 S3	8 rd	1/19 1/21	.03	n/a

Heavier good seeds

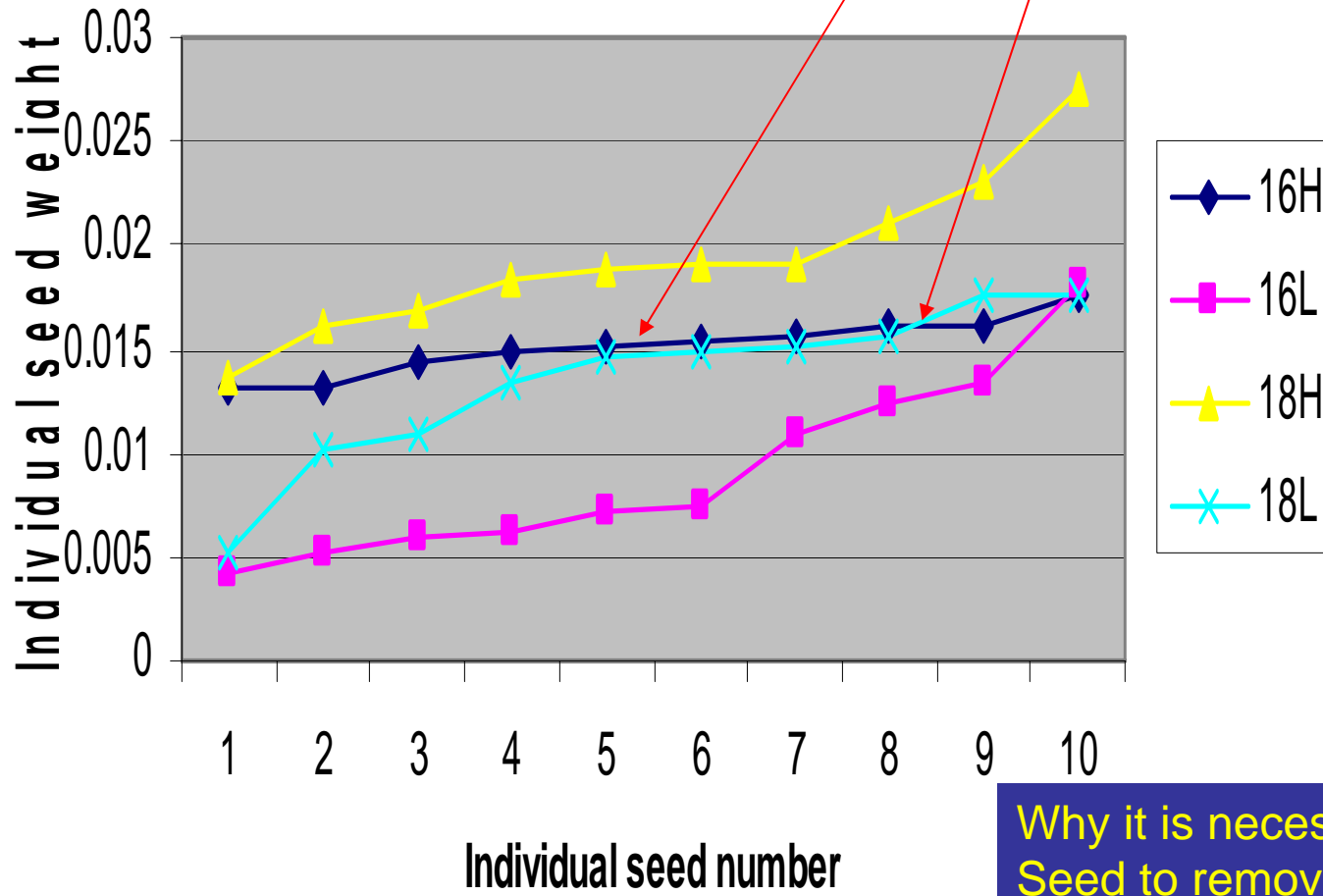


Insect hole

Lighter insect damaged seeds

Lomatium seeds separated in the column blower

Larger diameter light (18L) seed weigh the same as smaller diameter heavy (16H) seed



Why it is necessary to size Seed to remove lighter damaged seed



Probe



Sample holder



Meter

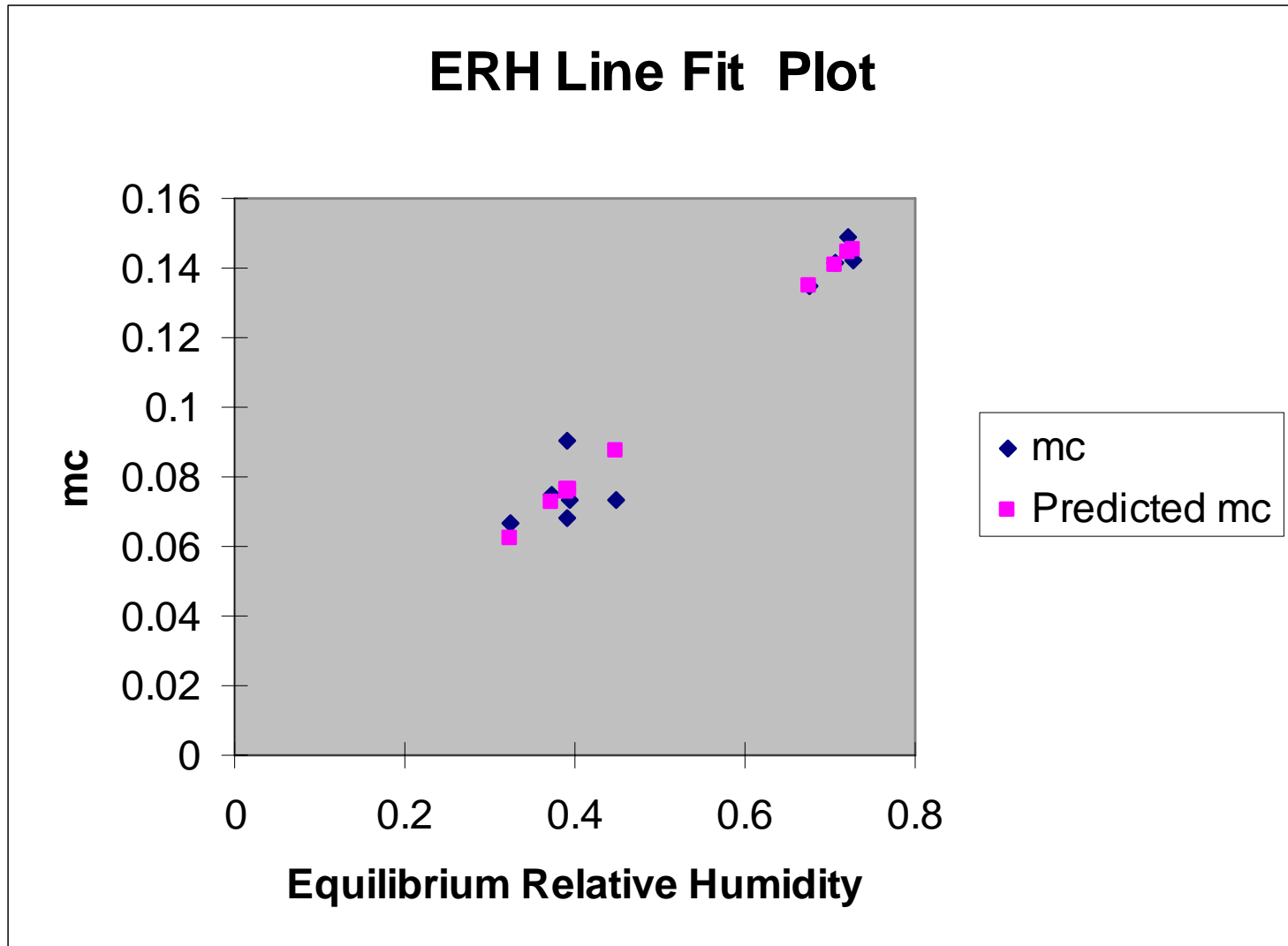
Measuring water activity A_w is the last step in cleaning the seeds

Water Activity Meter



Hygrometer measuring water activity (A_w) of seeds in a covered box

New Method for Monitoring Seed Moisture: Equilibrium Relative Humidity



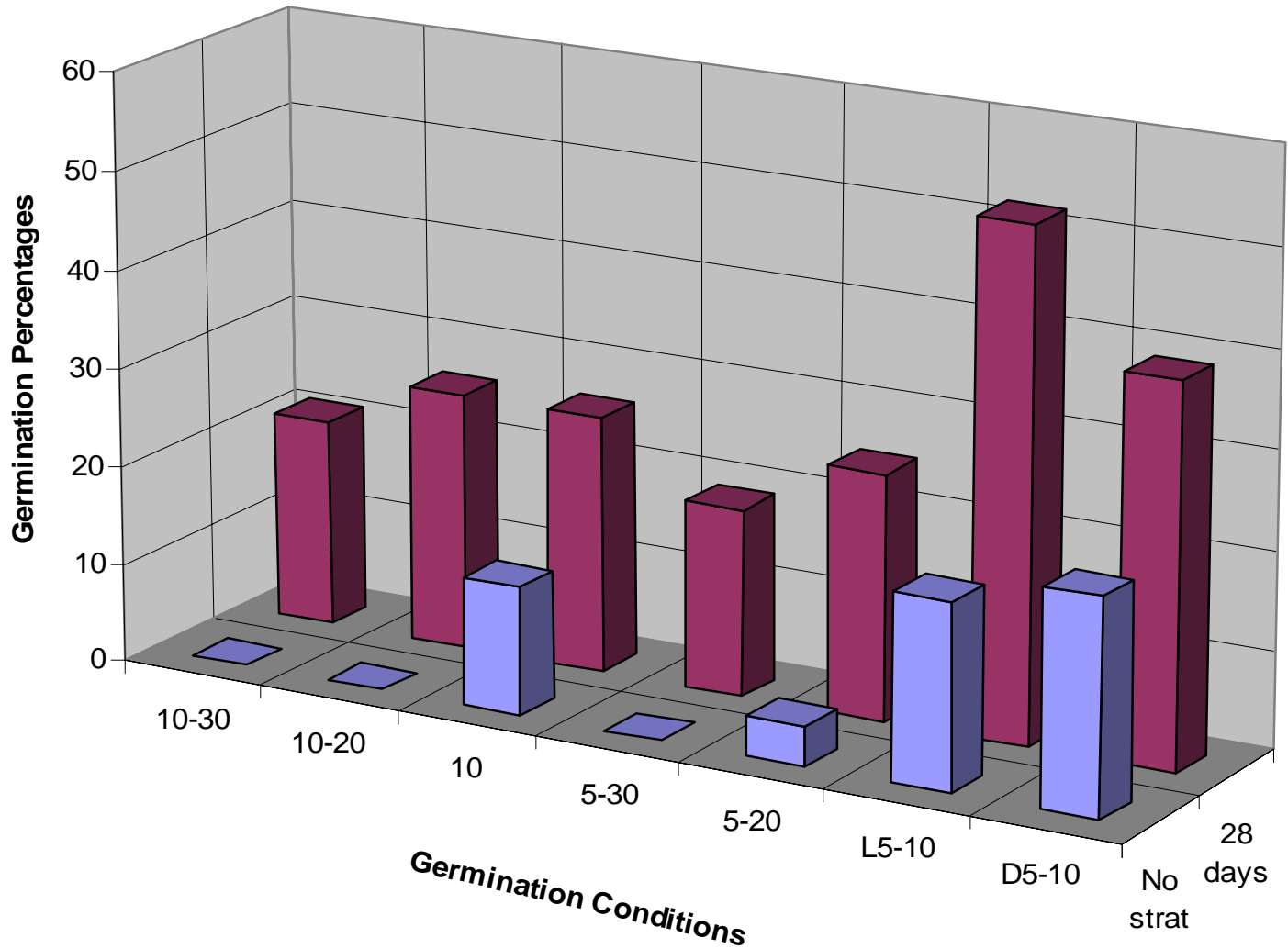
Germination Studies

(Continued)

- Started testing all species supplied to the NSL.
- Lomatium spp have been supplied in adequate numbers to get a pretty good picture of what the protocol will be.
 - Lomatium grayi 19 lots, 266 tests
 - L. triternatum 13 lots, 182 tests
 - L. dissectum 41 lots, 811 tests
 - 1,259 test total for Lomatium dissectum

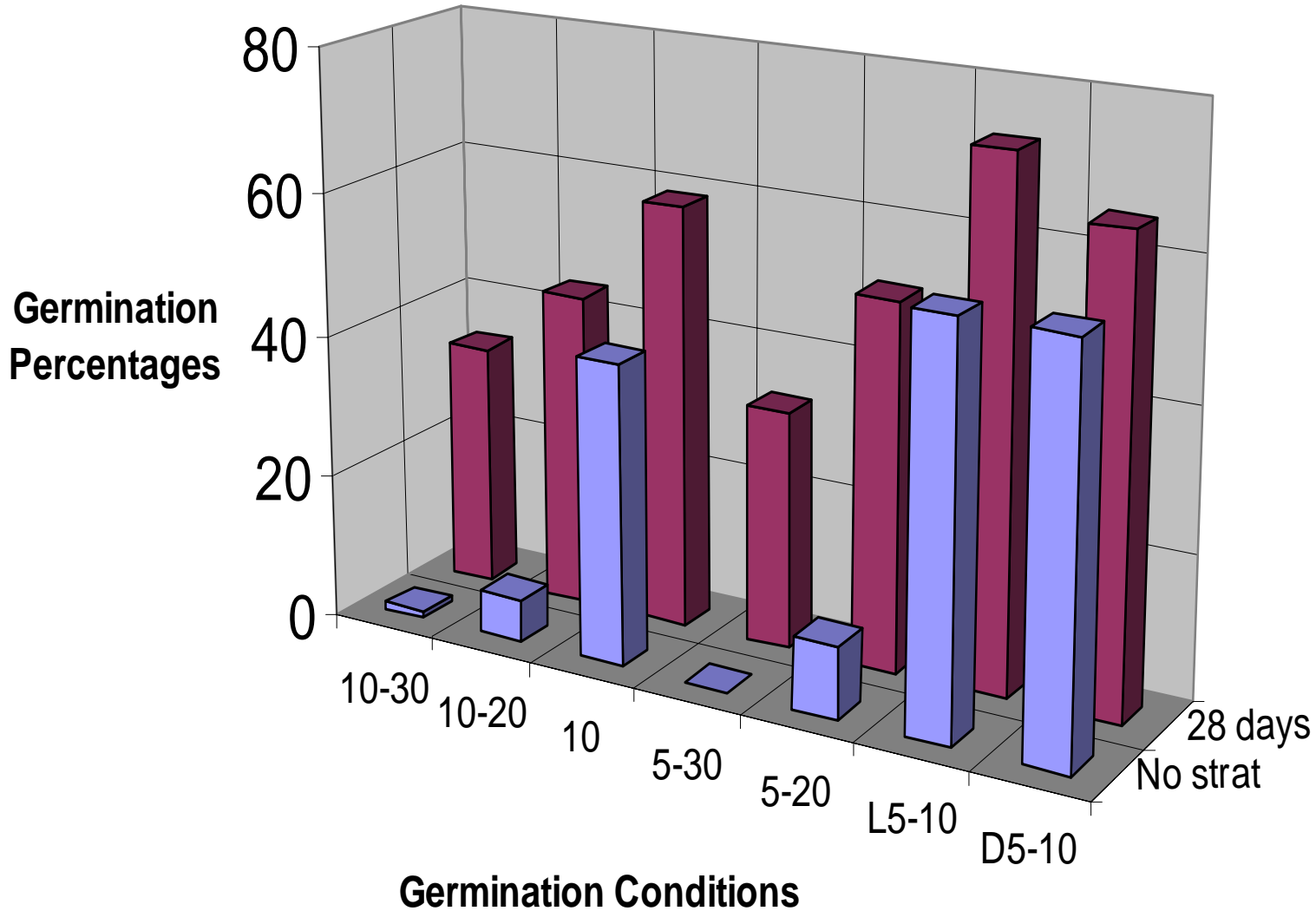
Lomatium triternatum Germination

7 seed lots 30+% germination



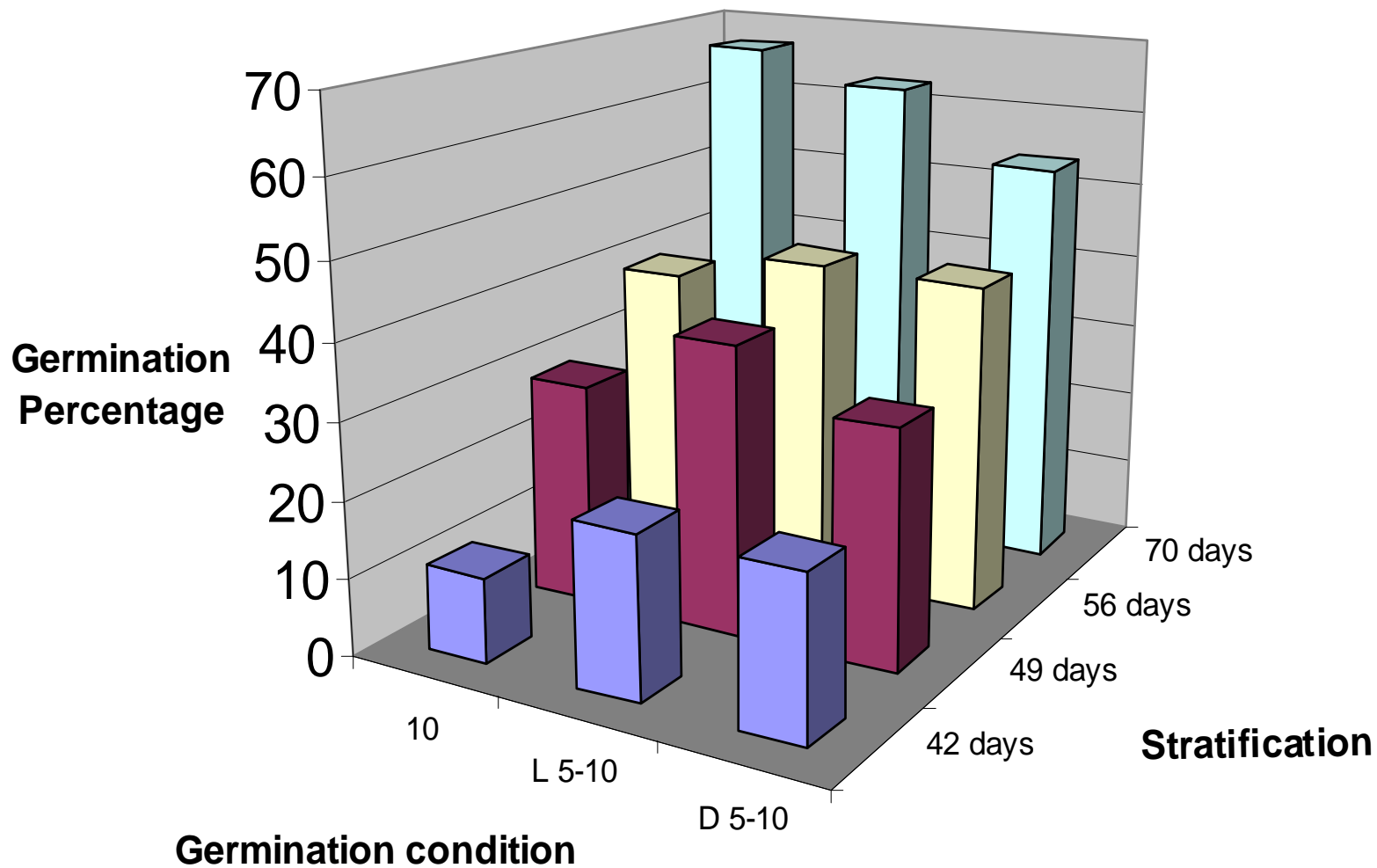
Lomatium grayi germination

12 lots 50+% germination



Lomatium dissectum Germination

11 seed lots 50% germination or better



Lomatium Germination Summary

- Germination will be at 10°C or less
- Light is not inhibitory, may assist
- *L. grayi*, *L. triternatum* will be easiest to germinate
- *L. dissectum* requires very low germination temperature or long strat period
 - Almost no germ w/o strat, very low germ w/ 28 days strat
 - Germination starts in strat at 56 and 70 days
 - What is the difference between strat and germ at 5°C
 - Will the plants actually germinate at 5°C?

Germination Studies 2008

- Should have a final answer on Lomatium
- Will expand to several more species
 - Seed lots are on the way to the lab
 - Have now acquired 10 new germinators
 - Sufficient capacity to explore lots of temperatures
 - Have worked out our procedures were we can be more efficient.