

HORTICULTURE 320 PLANT PROPAGATION

LABORATORY PROJECT : SEED PRODUCTION

Introduction	<p>The production of high quality seeds of horticultural plants is a prerequisite for successful seed propagation. In addition it is the major activity of the many seed companies that supply greenhouses, nurseries, garden centers, and homeowners with a great diversity of seeds. Many factors go into seed production including :</p> <ul style="list-style-type: none"> •the development of superior parents through breeding or by the selection of appropriate tree sources to establish seed orchards •the proper growth of these plants to maximize health and fecundity •efficient pollination mechanism to insure the proper hybridization of plants •processing of fruits to obtain uniform, high-quality, clean, and dry seeds •evaluation of seed lots for uniformity, 'trueness-to-type', viability and vigor, etc <p>The quarter-long activity you are about to undertake is designed to impress upon you the many factors that are involved in seed production and to give you an opportunity to produce your own seed. Because we are constrained by a 10-week period, we can only work with a limited selection of plants that will permit you to examine the entire process: from growth of mother plants to seed production and evaluation. You will work with the rapid cycling form of <i>Brassica rapa</i> (RCBr). This plant is ideal for experimentation because it completes its life cycle in about 40 days and can be grown with ease in a confined space under continuous fluorescent or HID illumination.</p>		
Objectives	<ol style="list-style-type: none"> 1. To examine the process of seed production starting with the growth of mother plants and culminating with evaluation of the newly-produced seed. 2. To maximize production of seeds of RCBr from a specific set of mother plants. 3. To apply the principles of pollination control for maximum seed production 4. To evaluate some of the factors that may influence seed production 5. To compare seed production in different genotypes of RCBr 		
Materials	<table style="width: 100%; border: none;"> <tr> <td style="vertical-align: top; width: 50%;"> <ul style="list-style-type: none"> •pots •seeds •water •small notebook </td> <td style="vertical-align: top; width: 50%;"> <ul style="list-style-type: none"> •trays •labels •growing media & fertilizer </td> </tr> </table>	<ul style="list-style-type: none"> •pots •seeds •water •small notebook 	<ul style="list-style-type: none"> •trays •labels •growing media & fertilizer
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Lab Overview	<p>Each group will be given seeds of wild type plants as well as two other genotypes. Students are responsible for the care of these plants from beginning to end. The goal is to produce as many high-quality seed as possible. Students will be shown how to sow the seeds and how to pollinate flowers for maximizing seed production. Once seeds are produced, their quality is evaluated by assessing weight and appearance, and, if possible, percent germination and emergence.</p>		
Data collection	<p>Students are required to record observations in a journal. The kinds of data to be collected include: date of planting, date of thinning (if done), date to first opened flowers, date when all plants flowered, number of plants used for pollination, number of flowers pollinated and times they were pollinated, number of fruits that developed, number of seeds per fruit, total number of fruit and seeds per plant, weight of seeds per plant, % germination of seed in a subset sample.</p>		

Data to be summarized

Here is a list of the data each group must collect during the project. A sample table is provided on the next page.

Per genotype:

- Total number of flowers pollinated
- Total number of fruits obtained
- Overall pollination efficiency (Nr fruits / Nr pollinated flowers) x 100
- Total number of seeds
- Overall number of seeds per fruit (Nr seeds / Nr fruits)
- Avg number of seeds per fruit (\pm standard deviation)

Seed quality

- Total weight of seeds
- Percent germination of a subsample of seeds (n=25)

Thought provokers

1. Do all plants produce about the same amount and quality of seed?
2. If there are differences between plants, what can account for such differences?
3. What would you modify in your production scheme to increase seed production or quality?

Preparing media and planting the seed**Procedures**

Materials needed:

- *Brassica* seeds of various genotypes
- plant labels, pots, and trays
- soil-less medium such as Redi-Earth® (e.g peat-vermiculite mixture at 1:1 by volume) or MetroMix® 360
- Fertilizer- pelletized, slow release form, Osmocote® 14-14-14; or liquid (specifics will be provided in lab)

1. Make sure the medium is pre-moistened but not overly wet.
2. Select up to 20 pots for each of the 3 genotypes and prepare a label for each pot indicating the genotype and your group identification. Note: use indelible ink or pencil to write on the labels.
3. If using pelletized fertilizer, fill each pot half-full with medium, add 6-8 Osmocote® pellets and fill-up the pot.
4. Make a small indentation in the middle of the pot and place 2 or 3 seeds in it. Lightly cover with medium and moisten.
5. Keep all pots containing plants of one genotype together on one tray; take the trays to the illuminated area designated for this purpose.

Caring for your plants

1. Water gently from above for the first 2-3 days to assure adequate moisture during germination.
2. Assess the need for watering on a daily basis. Be sure to fill the trays with water before the weekend.
3. After the seedlings have emerged, but no later than one week after planting, thin to one plant per pot.
4. Check for insect damage. This is usually not a problem, but insects can come into the growing area on your clothing. These plants are especially tasty to aphids. If you see aphids, remove them by hand or wash them off. Keep an eye on these plants and repeat the process until you see no aphids for 5 days.

