

BARLEY CROSSING METHODS

Plants for crossing can be grown in the field, or in glasshouses.

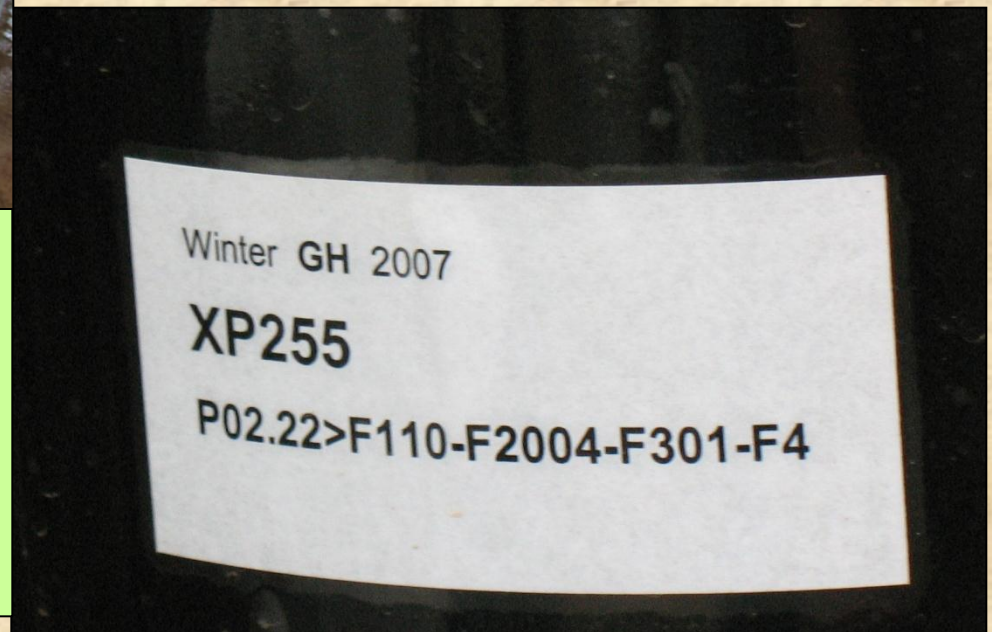


Indoor grown plants are generally easier to work with and crossing success is often better.



Pots are labeled and arranged on glasshouse benches.

The label for each pot contains information on the nursery name, plant identification number, and line name or code.

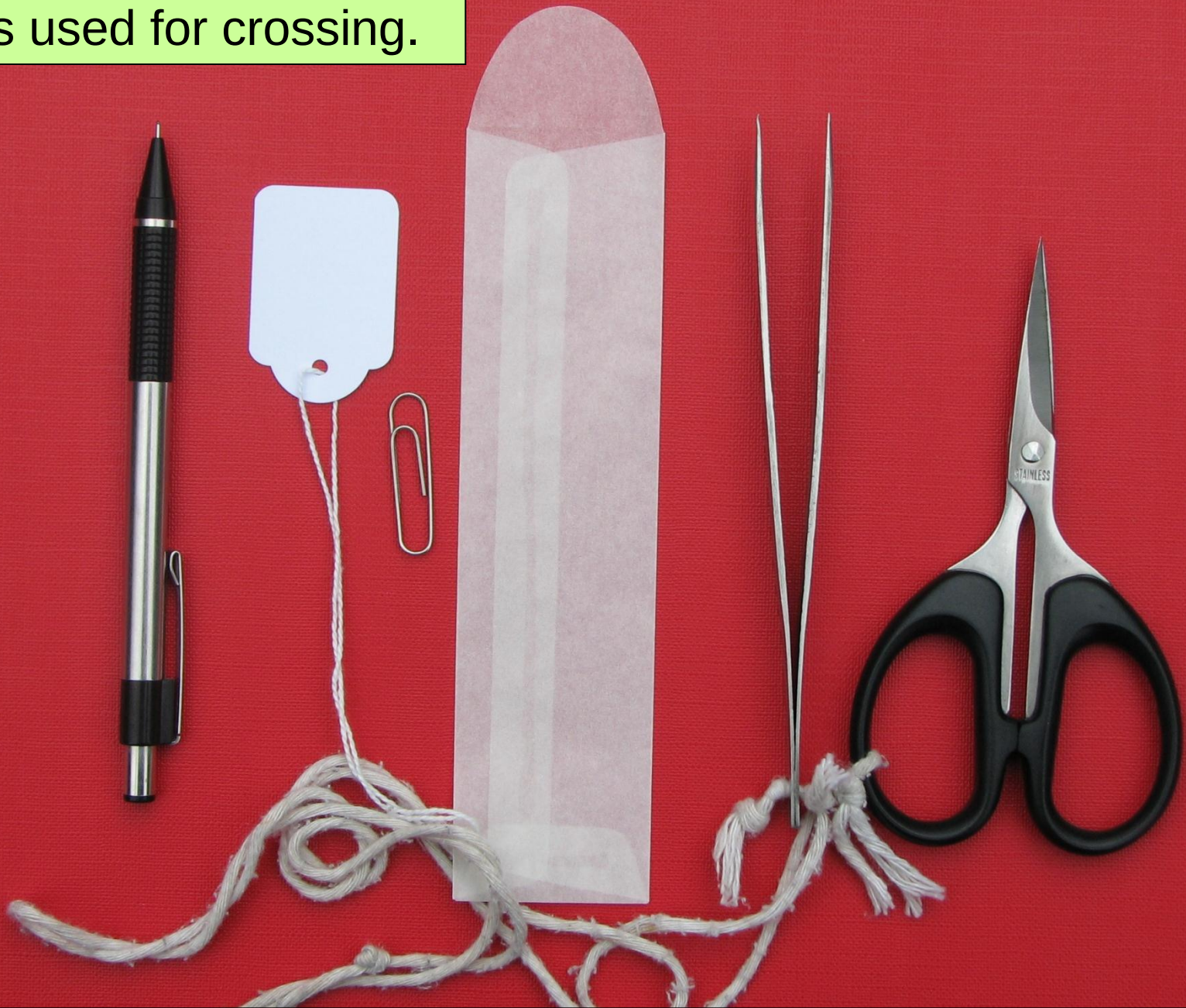


When working with plants, it is often better to remove the pots from the bench.

Select the pot and place it in a position so that it is convenient to sit while doing the crossing.



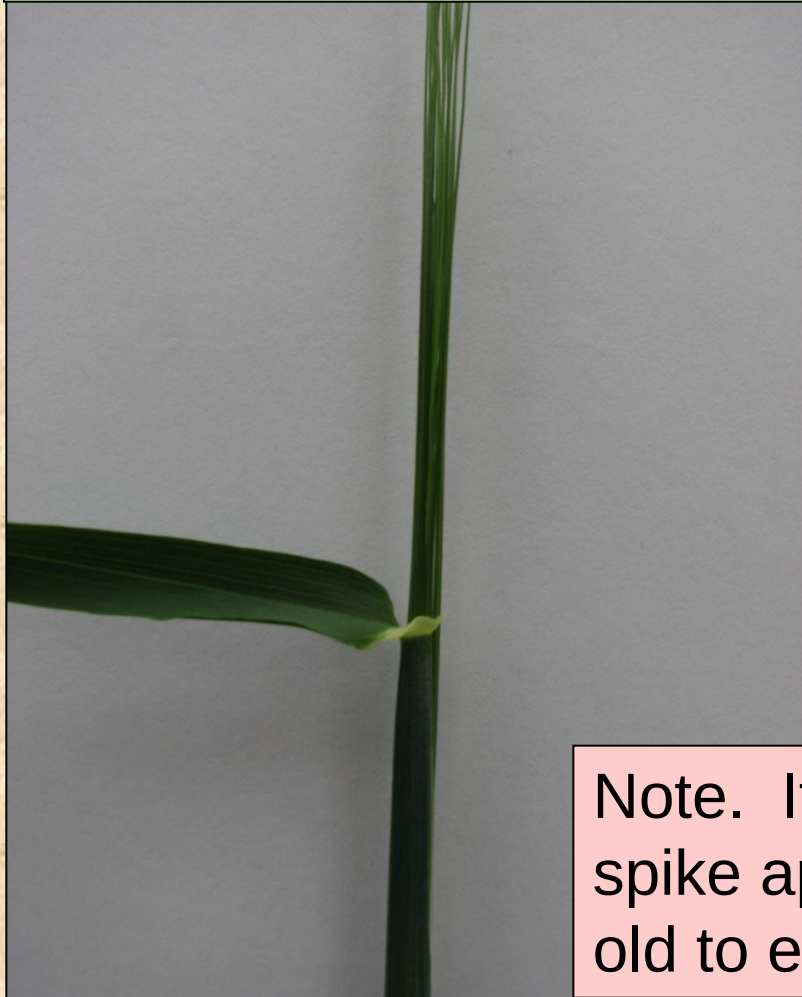
Tools used for crossing.



Special magnifying glasses may be used to see spikelets and their anthers.



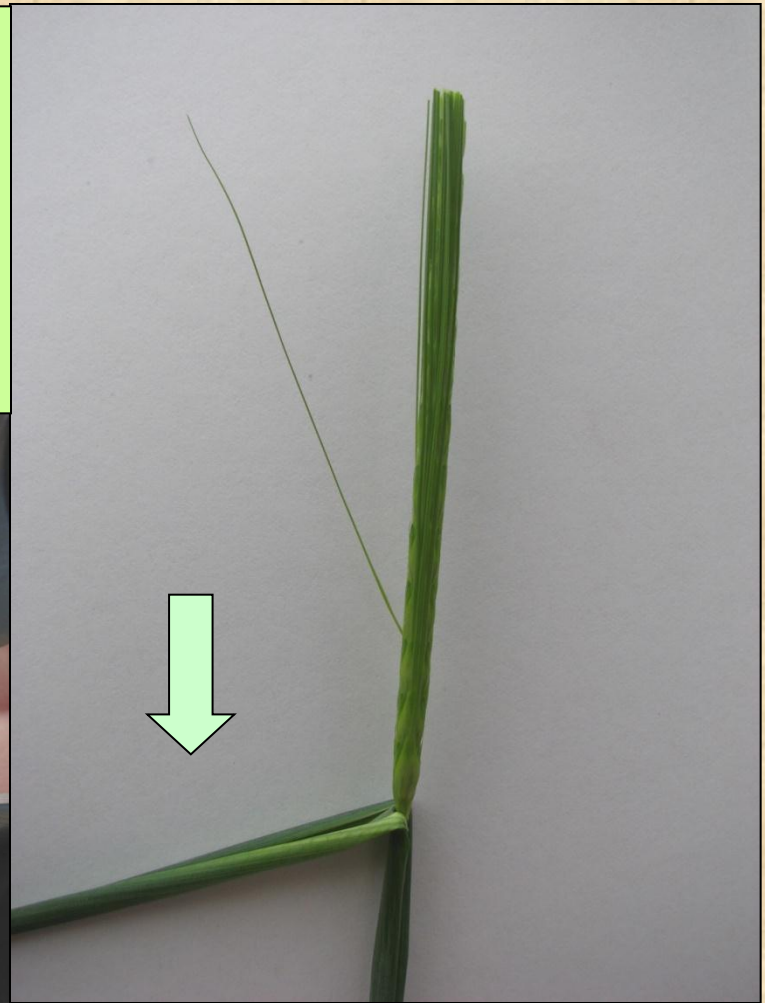
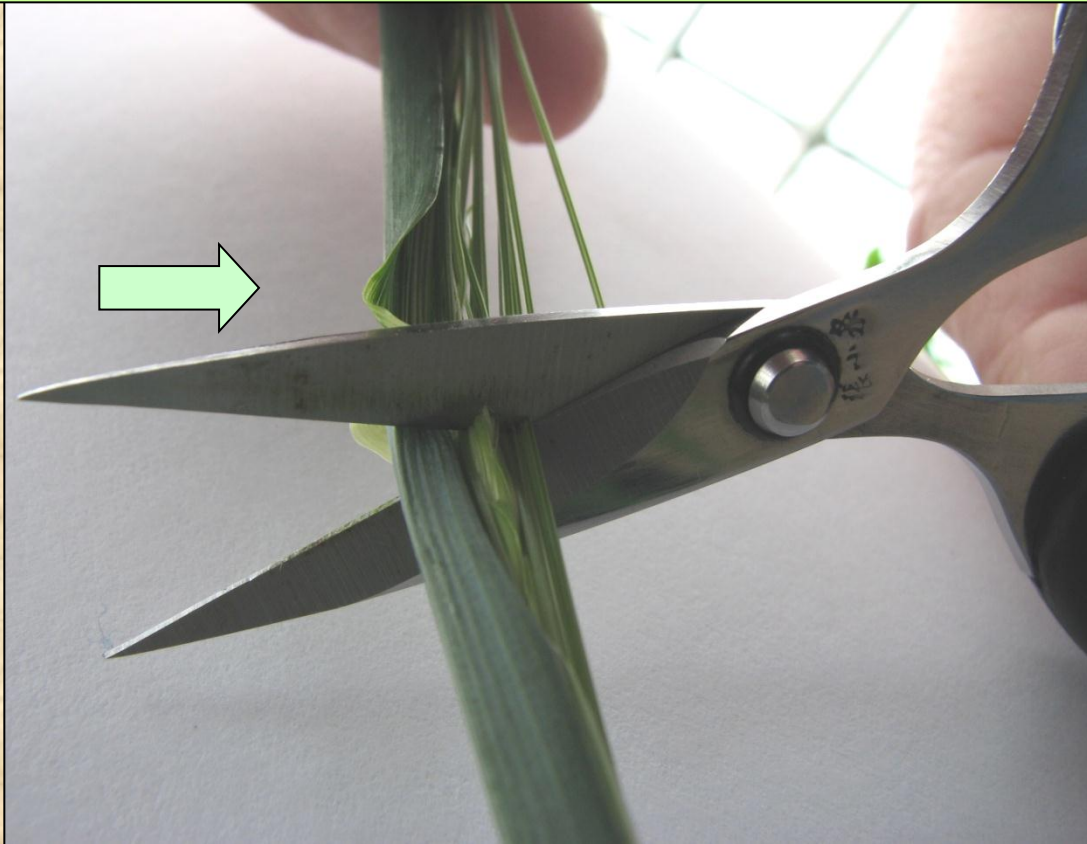
Choose the female parent,
a spike that has several
days of growth before
anthesis (pollen shed).



The anthers
are green in
this spike.

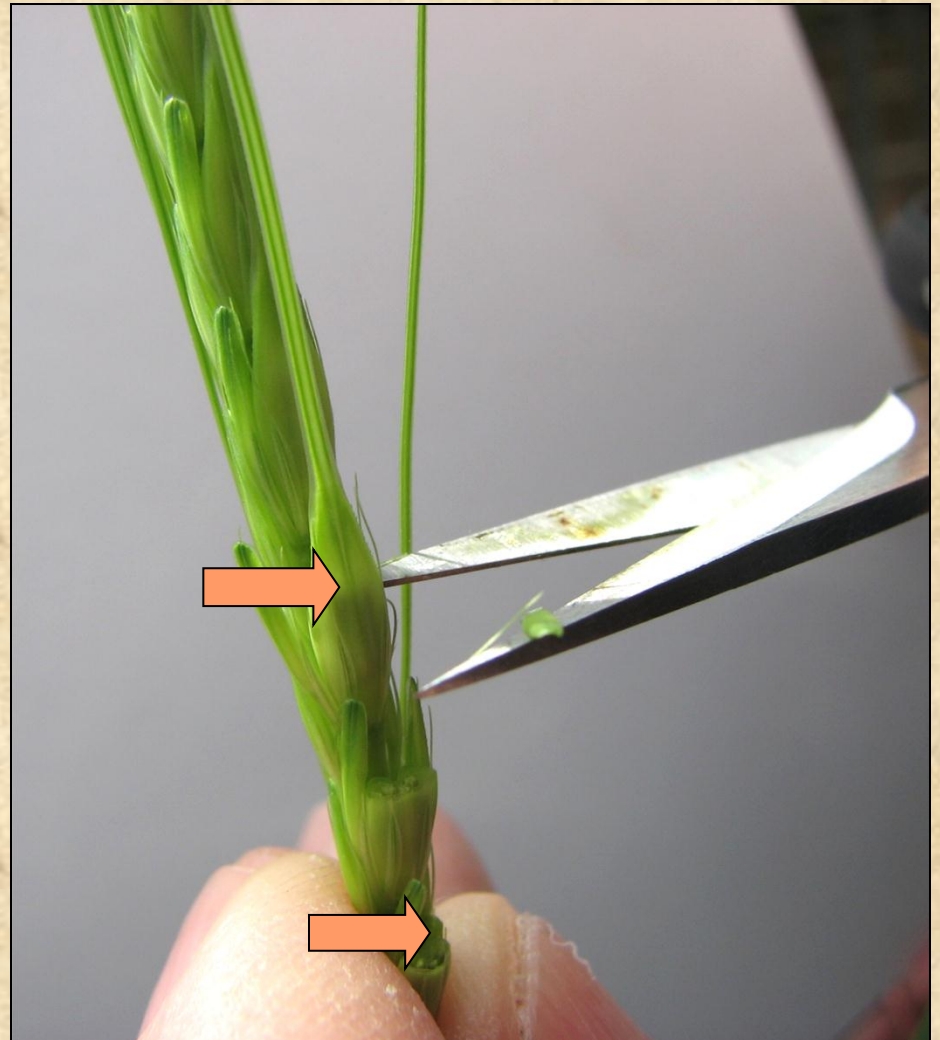
Note. If the anthers near the centre of the
spike appear pale yellow, the spike is too
old to emasculate.

Clip off the spike near the tip of the last spikelet; remove the flag leaf and the upper part of the awns.

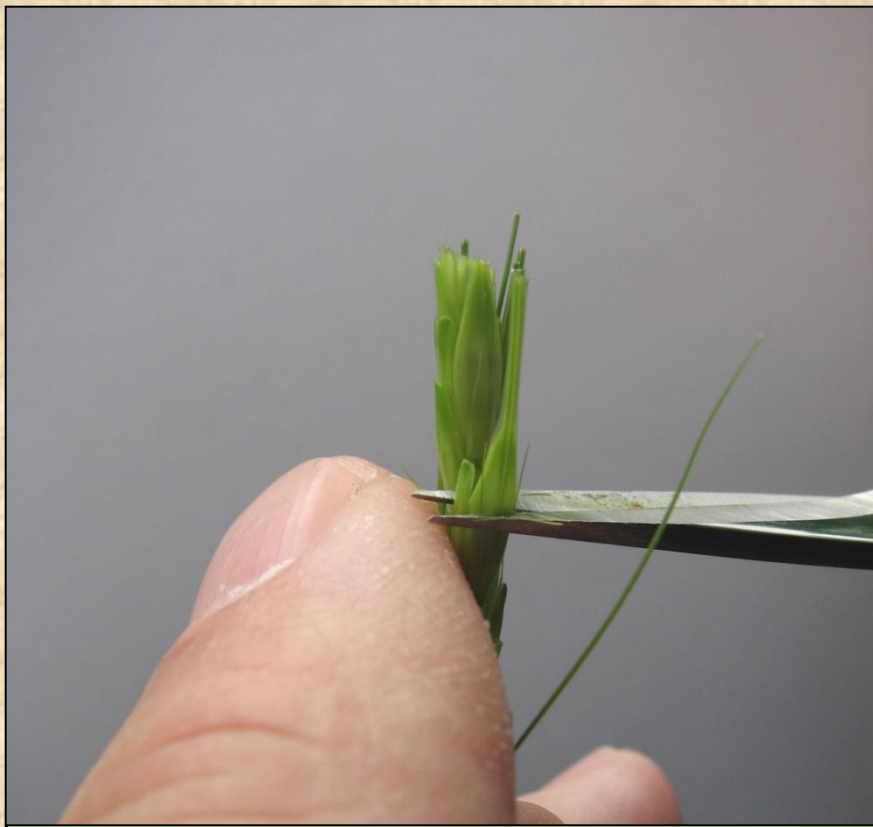


Expose the female spike by unrolling the flag leaf sheath.

Clip individual spikelets just above the anthers.



The anthers are generally visible inside the spikelet.



Clipping of the spike is complete when the awn and the upper half of each spikelet are removed.

Use a fine-pointed tweezers to remove the anthers (3) from each spikelet.



The female spike is emasculated by removing the three (3) anthers from each spikelet.



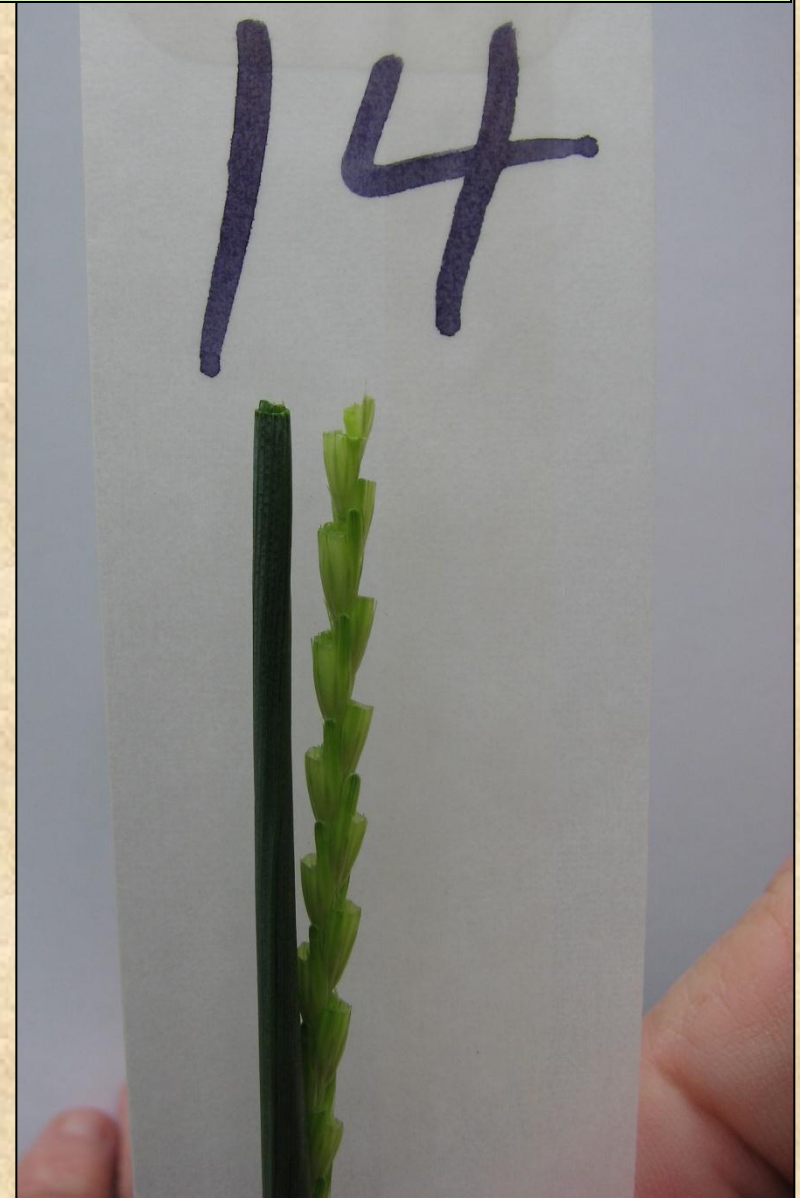
Re-check the spikelets after emasculating to make sure no anthers have been missed.

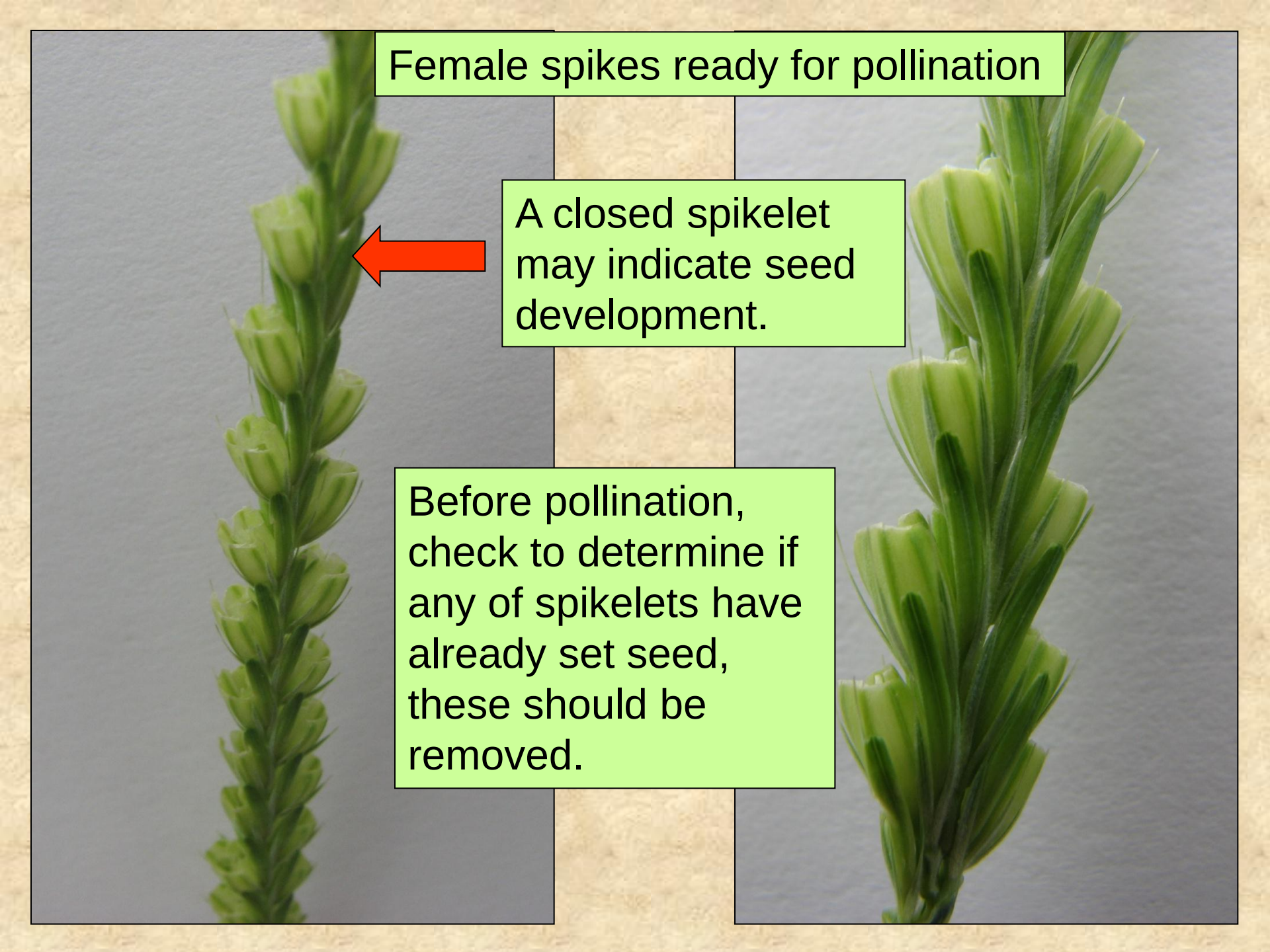
After emasculating the female spike has been completed, place it in a numbered glassine bag.

The number on the glassine bag indicates the day the emasculating was made.

The female spike will be ready to pollinate when the spikelets open ----- or show a gap between the lemma and palea.

Gapping of the spikelets will occur 2 to 7 days after emasculating, depending upon temperatures.



The image shows two green plant spikes, likely from a grass or cereal, against a grey background. The spikes are composed of many small, overlapping spikelets. A red arrow points from a text box to one of the spikelets on the left spike. The text boxes are light green with black borders and contain instructions related to seed development and pollination.

Female spikes ready for pollination

A closed spikelet
may indicate seed
development.

Before pollination,
check to determine if
any of spikelets have
already set seed,
these should be
removed.

The next step is selection of the male parent.

Chose the plant to be used as a male. Find a spike that has not shed pollen. The anthers are pale yellow and are still at the base of each spikelet.



Clip the spikelets above the anthers.

Male spike prepared for anther harvest.



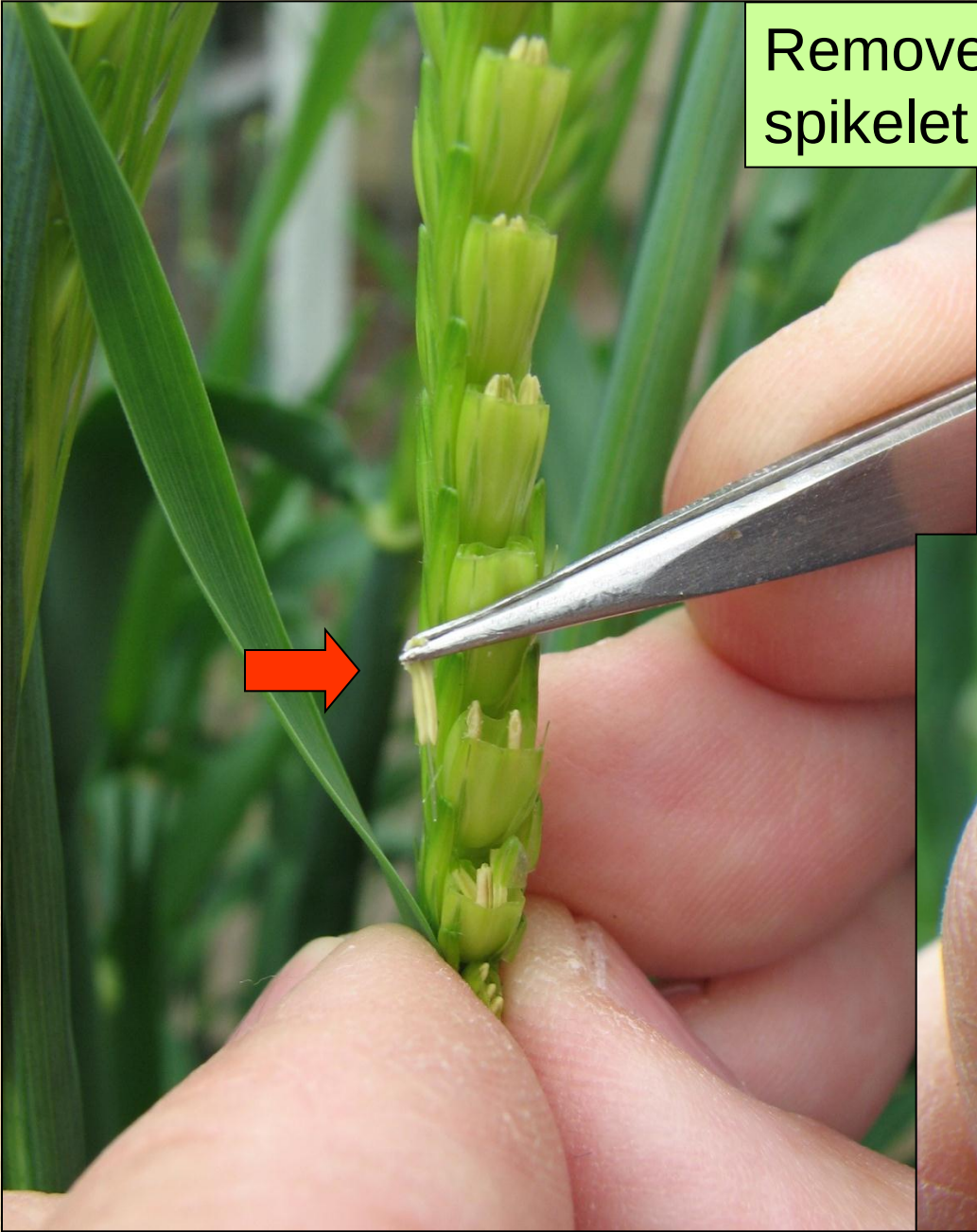


One to five minutes after clipping the spikelets of the male, the anthers start to enlarge (puff up).

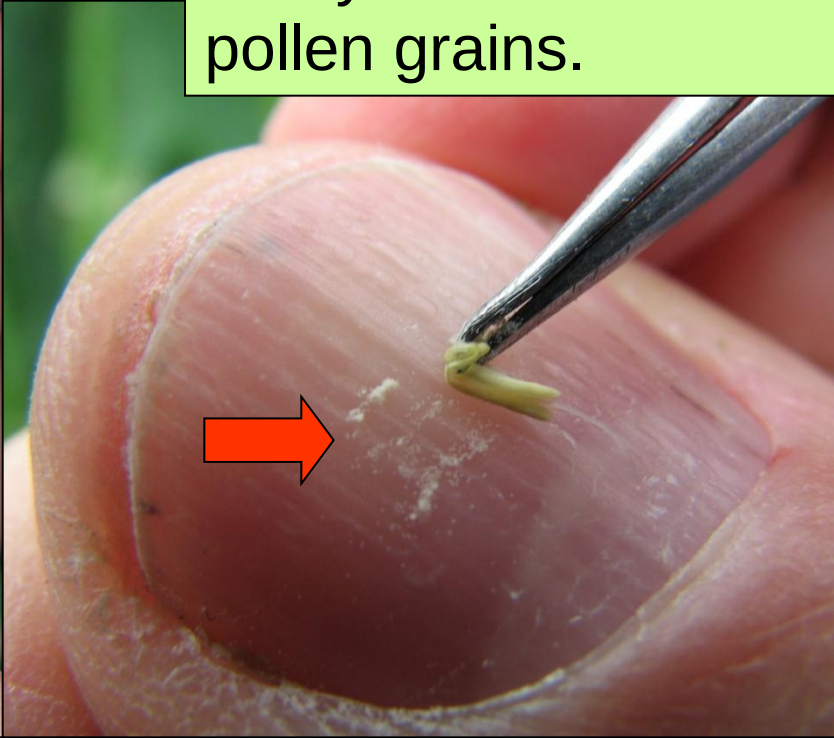
Shortly thereafter, the filaments start elongating and force the anthers upward.

When the anthers start to enlarge, they will shed pollen and can be used for crossing.

Pollination can also be done by the twirl method or by anther transfer.



Remove one anther from the male spikelet for pollination.



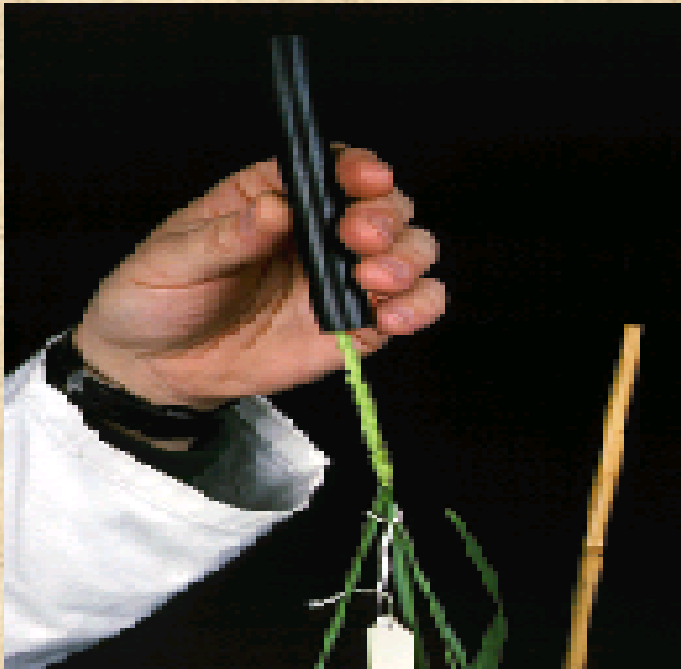
The anther can be easily broken to shed pollen grains.

Place the anther(s) above the open female spikelet (flower) and break the anther.



Each anther can be used to pollinate 2, 3, or more female flowers.

Twirl method: a tube is placed over the emasculated female parent and a male spike with dehiscing anthers is inserted through the top of the tube and twirled to shed pollen over the female spike.

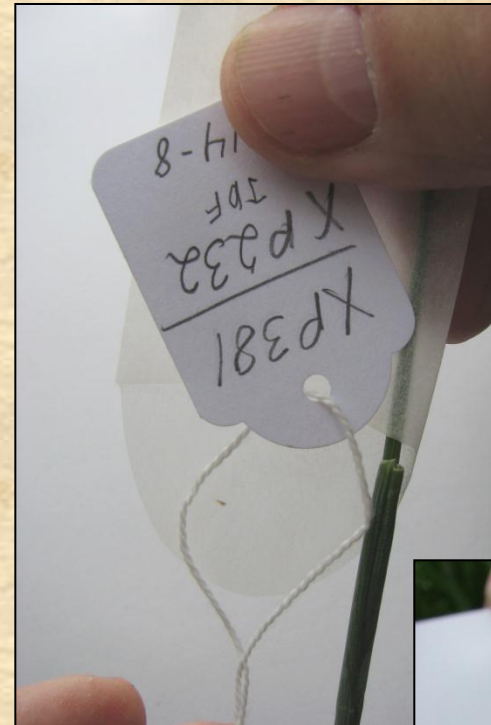


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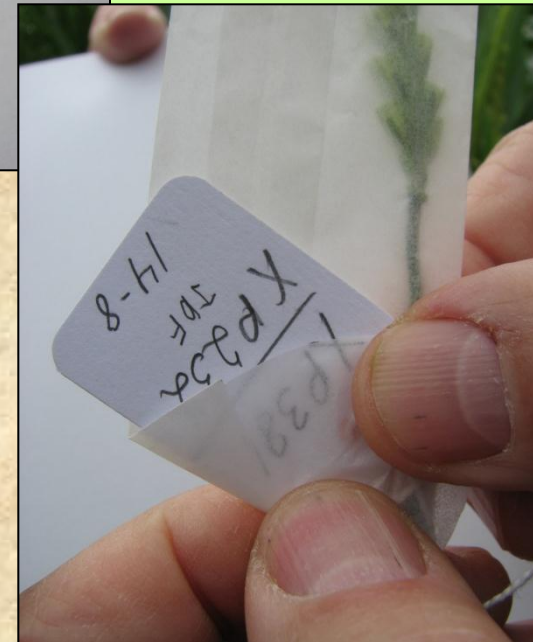


When pollination is completed, replace the glassine bag over the female spike.

Write a label for the cross with the female parent listed first, then the male parent. Also, write the date when the cross was made.

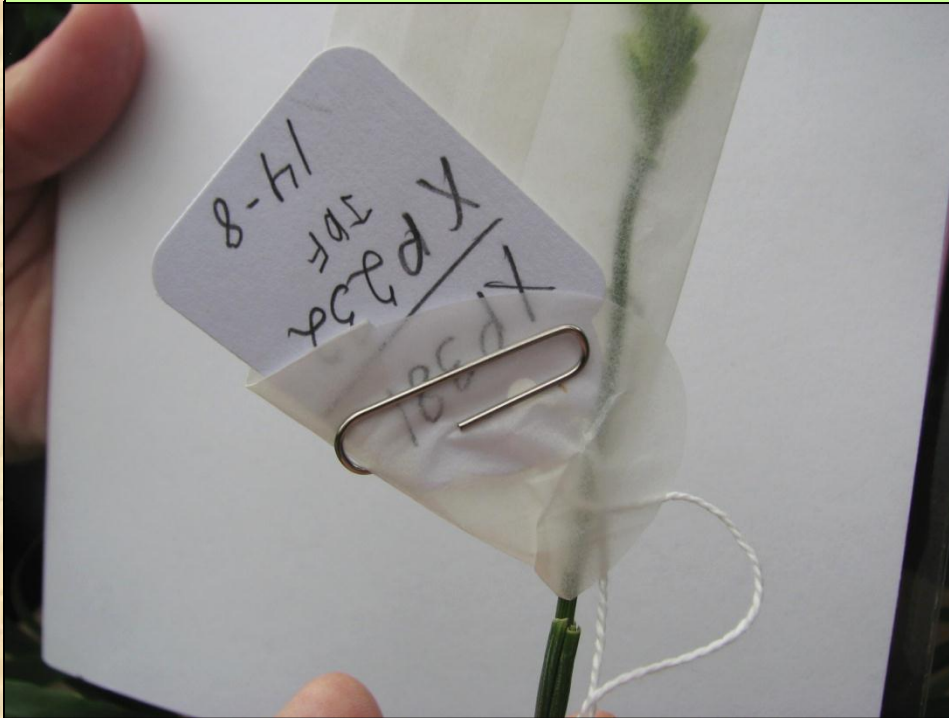


Place the tag near the bottom of the glassine bag and make a fold to hold the tag.



If the cross is successful, enlarging seeds (caryopses) will be visible in 7 to 10 days.

Attach the tag to the spike with the string, and to the glassine bag with a paperclip.



Acknowledgements

This protocol was developed by:

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