Crossing wheat and oat

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The first step is to choose parents and plan the crosses

- Make a list of available parental lines (may be registered varieties or lines from a breeding program) and their agronomic and quality characteristics
- Crosses are planned based on the characteristics of the parents and the objectives of the breeding program
- If your primary objective is to select for high yielding crown rust resistant oats then you may cross a high yielding variety that is moderately resistant to crown rust to a average yielding variety that is rated as resistant to crown rust
Plant parents every week for three weeks to ensure that maturities match up.

7-10 weeks after planting, the plants will be ready for emasculating.
Wheat Crossing Methods

Supplies needed for crossing include:

- scissors
- forceps
- alcohol
- crossing bags
- crossing tags
- paper clips
- a pencil
Wheat Crossing Methods

1. Choose male and female parents

2. Emasculate female parent
   - Emasculate female parent when the spike is pre-anthesis but clear of the flag leaf
• Remove spikelet's at the base and very top of the spike

• Remove florets from the central part of the spike

Central floret being removed. The outer florets are left in place
Using scissors cut the tops of the florets off.

Florets are cut on an angle to allow easy access to the anthers.
Anthers visible once the tops of the florets are removed
Remove anthers – each floret contains 3 anthers

Once anthers are removed from each floret the spike is male sterile
Wait a few days before pollinating to allow the stigmas time to mature

- Place a bag over the spike to avoid accidental pollination

- Attach a tag to the spike to identify the male and female involved in the cross
Wheat pollination:

• Remove bags from emasculated spikes and check for seed developing or anthers shedding – if all anthers were not removed discard spike

• Find a male plant that just starting to shed pollen and cut a spike from plant
Cut open the top of the bag and insert male spike, twirling to allow pollen to be shed.
• Close bag with a paper clip

• Bags can be removed approximately three weeks after pollination
Oat Crossing Methods

Supplies needed for crossing oats are similar to that for wheat, except instead of crossing bags dialysis tubing is used to keep the male and female panicles together.
Oat Crossing Methods

1. Choose male and female parents

2. Emasculate female parent
   - Choose a female panicle that is just emerging from the flag leaf
   - Peel back the flag leaf and remove underdeveloped spikelets
• Peel back glumes
• Remove secondary floret
• Fold glumes back over the primary floret
• Cut the floret back until you can just see the anthers
• Remove the three anthers
• Aim to emasculate 20 florets per panicle
• Remove any remaining florets that were not emasculated
3. Pollination

- Remove anthers from the male parent and dust the pollen on top of the female flower.
- Clip back the male florets to allow pollen to shed.
- Place male and female panicles in dialysis tubing.