Safe Hybridizing

Text and drawings
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Safe (controlled) hybridizing doesn't come easily. It is inconvenient, time consuming and, in its process, resembles ornaments on a Christmas tree.

Every breeder exercises some degree of control. It may be no more than selecting good parents based on surface qualities while giving little regard to genetic background. There may be little or no effort to ensure a cross against contamination and records will be only a matter of memory. Successful hybridizers who use this unsophisticated method must have an intuitive gift, in which case they can rival the most scientific breeders.

However, those of us less fortunate in *not* being gifted, must learn to play the game with accurate information. Not only must we note trends of our lines but also have reliable records of what caused them to happen. Building good insight to control your hybridizing choices must come from detailed observations and accurate data. Feed your brain junk and junkie directions are what you can expect in return.

Working with converted tets is challenging and therefore demands control to avoid being misled. However, the method suggested here, for controlling your crosses, is not limited to conversions but applies wherever accuracy may be beneficial.

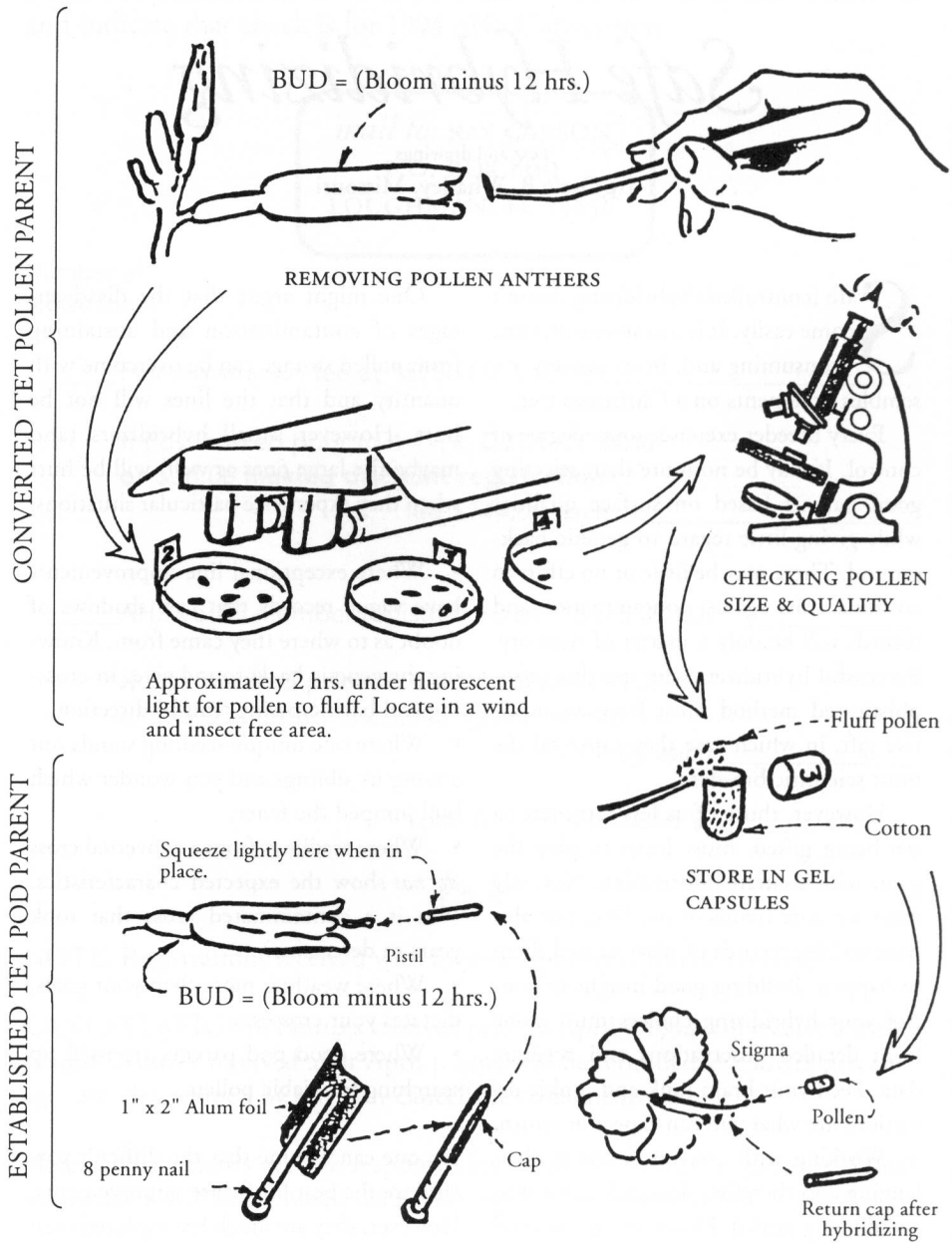
One might argue that the disadvantages of contamination and abstaining from pollen storage can be overcome with quantity and that the lines will not be hurt. However, small hybridizers (and maybe the large ones as well) will be hurt when they experience particular situations:

- Where exceptional line improvements have vague records that cast shadows of doubt as to where they came from. Knowing the genetic background gives in-crossing and back-crossing fruitful direction.
- Where one unique seedling stands out among its siblings and you wonder which bull jumped the fence.
- Where seedlings from a converted cross *do not* show the expected characteristics. Was it a contaminated cross that took years to determine?
- Where weather, more than your goals, dictates your crosses.
- Where good pod parents are used up searching for viable pollen.

No one can assume that the difficult parents are the best for future improvements. However, they are much less explored than the easy parents. Hopefully, some much needed characteristics are lurking in the recessive genes of these difficult parents

HYBRIDIZING WITH CONVERTED TETRAPLOIDS—PART III

Illustration showing steps taken to assure "safe" or controlled cross



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and controlled hybridizing will make those improvements more accessible.

Refer to the adjacent illustration and let's question each step and the reasons for using them.

Q-I. Why should we collect pollen, expose it to lights, and store the ripe pollen 12 hours (perhaps more in some cases) before the flower opens?

A-1. The highest viability of pollen occurs *when the pollen sac begins to open.* Many varieties in the garden will have exposed their fluffy pollen to the elements long before dawn. Collecting before the pollen is ripe eliminates any chance of loss or insect contamination.

A-2. You will have control of the time for pollen ripening; even late pollen in the garden can be expedited by exposure to cool fluorescent lights.

A-3. It will be more convenient to observe when the pollen sac is opening. Collect and store the pollen immediately after ripening in a cool dry container which will slow down the deterioration of its viability. Garden pollen has been observed to lose half its viability in less than 3 hours at temperatures above 80°.

A-4. Rare pollen collected and stored properly with cotton can effect 10 times as many crosses as using it directly from the stamen.

A-5. To avoid risk of losing your pollen to rain. A water soaked pollen sac does not have to be open to be lost.

Note: Pollen can be stored on opening flowers for one day in the refrigerator without serious loss of viability. Longer storage on an open flower is not advised.

Q-II. Why use MID [microscopic identification] on the pollen the night before?

A-1. The morning period for the most receptive conditions on the stigma is probably limited to a few hours. If you choose to test by MID at the expense of that time, you more than likely will miss a lot of good crosses.

A-2. Not only can we determine the ploidy by doing MID in the evening but viability percentages can also be evaluated. (This method will be explained in Article IV). Knowing the ploidy and viability prior to hybridizing can keep a lot of bad pollen off the stigma of good pod parents.

Q-III. Why store pollen in gel capsules with cotton?

A-1. Gel capsules are readily available from your pharmacy; they are easy to handle and allow moisture to be transmitted from the pollen when stored in a dehydrating container.

A-2. It is easy to mark their identity with a felt-tip marker.

A-3. The cotton wad holds the pollen in a manner similar to snow on an evergreen tree, and releases the pollen to the stigma in frugal amounts while giving adequate coverage. Also, the cotton prevents caking when exposed to humidity during the crossing.

Q-IV. Why protect the stigma with an aluminum foil cap?

A-1. It will provide post-protection from rain for the time needed to germinate the pollen tubes that enter the style (approximately one hour).

A-2. The pre-protection from insects with dusty feet is probably the least considered and most likely the main cause of contamination. Seeing pods form that I did not pollinate and radical seedlings among fairly uniform siblings convinced

me that contaminated crosses are far more frequent than we dare to admit.

It would be impractical to use this controlled method on every cross but surely some crosses can be worth the effort. I temper my excitement when I know a pod has not had this method of control, because I must await the bloom to verify the accuracy of the cross. However, when a rare and difficult cross sets a pod and safe hybridizing methods have been employed, I get confident and start counting my chickens a little earlier.

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Our final Article IV on ***Pollen Viability*** will share a study and method not previously covered in the *Journal.* I believe there will be some new and interesting revelations about pollen-tube growth and pollen-viability peaks and deterioration under garden and storage conditions.