

Lily Culture: Hybridizing Martagons

By Frans Officer with photographs by Denese Erickson & Sandy Officer

When I first planted *Lilium martagon* bulbs some 26 years ago, hybridizing was never a goal. My main objective was to use these shade-tolerant plants to give my hosta dominated garden in the woods some vertical structure. I found the small down-facing flowers quite beautiful. Even after the blooms were gone, the whorled-leaved plants continued to add character to my garden, So I decided to look for a few more. This simple sounding plan turned out to be not quite that simple.

Martagons were not all that easy to find in the mid to late 1980's. There were only seven or so cultivars available in Minnesota and some of these were yet-to-be-named seedlings. Remember that these were pre-internet days. "Googling?" Back then, it consisted of talking to as many gardeners as possible and/or finding reading material on martagon culture and sources for bulbs. "Networking" was following tips, making phone-calls, driving to people's gardens and attending neighboring states' Regional Lily Societies meetings and bulb sales. And, yes, I was in fact a very early "spammer": constantly pestering people for more Martagon cultivars I didn't have yet. The more difficult the search, the more determined I became. Flying to a NALS meeting or two. Sending for the ELG (European *Lilium* Group) catalogue and ordering from it. Remember that Beanie Baby craze? Trust me, this Martagon thing was worse. A lot worse.

After a while, I had over 30 different cultivars in my garden. I had my vertical structure among the hosta and a variety of colors when the Martagons bloomed. And the Martagon leaves were a pleasant surprise with their differing shades of green and sometimes mottled markings. And as I looked at the martagons in my garden I noticed I was smiling. Grinning, actually. And I knew I was hooked. So I took the logical next step.

While focused on my quest to increase my Martagon

collection, I kept running into people who suggested I should be "hybridizing". At first I didn't give the subject much thought. Who would possibly want to produce seeds that took 7 years to flower? But Mr. Greed kept whispering in my ear: "More! More bulbs! More!" People like Gene Fox and Hugh and Ruth Cocker and others took the time to give me very specific step by step instructions on what the process entailed. So when the next Martagon season rolled around, I decided to try it. And as I dabbed my very first pollen I still remember today what I was thinking at the time: "No way this is going to work!" Followed a few weeks later as seedpods started to form by: "Well, I'll be! IT ACTUALLY WORKS!"

Being neither a scientist nor a geneticist, my hybridizing efforts are non-commercial. Let's face it: to try being commercially viable in hybridizing plants that take 6 to 7 years from seed to flower is a blueprint for many, many lean years. There have been (and will probably continue to be) attempts by hybridizers to combine Martagon 'blood-lines' with those of non-Martagon lilies. David Sims and Norgart Martschinke have proven that there are some fascinating and beautiful results possible with their 'MartAsians' and 'MartAms'. But those results do not seem to be commercially viable yet. For the time being the hybridizing of martagon x martagon appears to be the exclusive domain of the individual hobbyists. With that in mind, let's look at some of the necessary tasks in creating new Martagon cultivars.

Open pollination

"Open pollination" (or OP) refers to seedpods created by insect-pollination. Although some purist hybridizers may scoff at open-pollination, I do not. Some well-respected martagon people including Ieuan Evans and David Herbergs have grown some wonderful martagon

cultivars from OP seeds. As David once told me: “Mother Nature has been and will be at this hybridizing thing a lot longer than I will!” My own experience with OP martagons bears this out: the OP process has yielded some wonderful ‘chance seedlings’ in my garden (photos A1, A2, A3).

For people who have limited free time because of business careers, child-rearing, etc., OP is a huge timesaver. For example, I estimate that during bloom-season I spend a minimum of 8 hours a week on tasks involving specific-cross hybridizing. By going to OP, busy people could save all those hours by not dabbing pollen themselves and still be involved in creating new martagons. Record keeping is also simplified because only mother-parent information has to be collected/ documented, and that task can wait until the seeds are harvested. The only question unanswered when looking at an OP cultivar is the iconic: “Who’s your daddy?”

Keeping records

The biggest mistake I made initially was not keeping detailed records. I was so anxious to plant as many Martagon seeds as possible that I mixed all available seeds together. Specific- cross seeds obtained from various seed exchanges (donors, please accept my apologies!), specific crosses I made myself, as well as open-pollinated seed I harvested in the fall. My goal was to germinate as many seeds as possible. The result was that for the first three or so years, all the seedlings

I managed to raise to bloom had to be classified as “chance seedlings”: no record of either parent. Today I keep all seeds separated and record all pertinent data. Even with OP seeds, I now know at least who the mother parent is.

Data I collect

I keep a searchable, computer database with the following five columns: 1. “Year” (Only the year of the cross is recorded, since the actual day of pollination does not seem to yield useful information); 2. “Pod-parent”; 3. “Pollen-parent”; 4. “# of seedpods harvested” and “# of viable (= embryo’d) seeds from those pods”, and 5. “Notes”.

To avoid taking a computer into the garden while hybridizing, data is minimized on a 5” plastic tree-tag wrapped around the lily stem. (it’s of course important to use a non-fading marking pen that will withstand the sun and rains for the months it takes for seed to form and ripen (see note 1). The tag may read: “PW x ROB /3”. At harvest time this plant-tag info stays with the seeds and is then entered in the computer database in more detail as: ‘2014’, ‘Port Wine’ (pod-parent), ‘Mrs. R.O. Backhouse’ (pollen-parent), “3” (= number seed-pods)/ “65” (= number of viable seeds). (see note 2).

Over several years, the latter two columns will yield useful data on the relative fertility of various cultivars, either as a mother plant or as a pollen parent. If after a few years a cultivar produces few or no viable seeds as

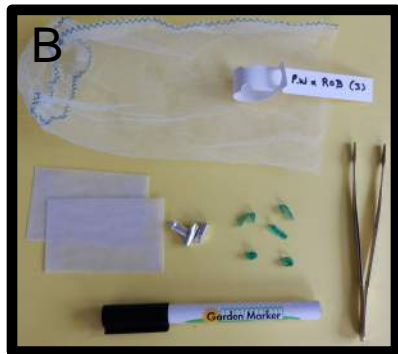


a pod-parent, I'll try to use it as a pollen-parent instead. A good example is 'Pink Taurade'. It has a beautiful flower, but it yielded very few or no viable seeds for me as a mother-plant. But its pollen seems quite potent and has yielded good viable seed for me with several different mother plants.

Data from open-pollinated plants is recorded as above, but "OP" is listed in the pollen parent column. This data is also helpful when assessing mother-plant fertility before making a specific cross with that plant. For example, if plant XYZ had 3 OP seedpods last year that produced 160 viable seeds, chances are that it may well yield as many seeds when used as a mother-plant in a specific cross with a plant that has shown good pollen-fertility.

Steps in specific cross pollination

There are six steps: 1. planning crosses, 2. collecting needed pollen, 3. applying pollen, 4. protecting the mother-plant's stigma before and after the pollen is applied, 5. recording the crosses made, and 6. marking the pollinated flowers (photo B: hybridizing tools).



1. Planning crosses:

Once spring arrives, garden clean-up and other chores put a heavy demand on time. So I generally plan my crosses during the winter. I review crosses made in past years and identify those I may want to repeat. Perhaps because no or few viable seeds were produced and I want to test the fertility one more time. Other times, even-though there was good seed-production, I like the potential of the two parents and would like to have more seed for germination. The second part of my "to-do" list are new crosses

to make. Some come from notes I've made the previous year. But the best tool in this process is to review the Martagon photos taken in the garden the past two years or so, especially of new seedlings. Just to confirm that the parents have the traits you want to pass on. So take as many good pix as you can.

The traits I look for in choosing parents are healthy plants, of course, and attractive, non-blah blooms. One of the important traits I look for is the shape of the pedicels. Some pedicels come out from the stem at a 90 degree angle, than fall straight down in another 90 degree angle to dangle its bloom there like a broken elbow dangles a hand. But others (oh joy!), curve upwards from the stem in almost a 45 degree angle, than gracefully curve towards the horizontal and slightly down to display their bloom as much out-ward as downward. The pedicel is almost "S"-shaped. Gorgeous!

My plans do not include specific color results for a cross. This is quite tricky for non-geneticists, so color is not one of my goals.

2. Collecting pollen: I have two sources for pollen. The first one is pollen from previous years stored in the freezer section of my refrigerator in small non-plastic, glassine envelopes. Pollen seems to remain viable for quite a while: I've made some successful crosses with 4 and 5 year old pollen. After 5 years I usually discard pollen and replace it with fresh, current pollen. I keep pollen beyond 5 years only if it's from a very desirable cultivar whose pollen is no longer available to me.

One of the advantages of storing pollen from previous years is that early blooming martagons can now be dabbed with pollen from late-blooming cultivars that aren't open yet. If I have stored pollen for a cross I plan to make, all I need to do is remove the specific pollen envelope from the

freezer and let it thaw out for about 20 minutes before using it. It's returned to the freezer as soon as its pollen has been used.

If I don't have the necessary pollen stored, I will need to collect it in the garden in one of two ways. In some cases, I carefully peel open a fat, almost-open flower-bud from the pollen-parent, pull the anthers off the filament with tweezers (photo C) and place them into a non-plastic glassine envelope which is then placed on a sunny window-ledge in the house where the anthers dry and "ripen" for a couple of days before use. Other times I will collect pollen from flowers that have opened in protective "baggies" (see 4 below).



3. Applying pollen: I

use two tweezers and one anther for pollination. To begin, I thoroughly wipe my tweezers on a rubbing-alcohol-soaked rag, then dry them with a clean rag. I put these aside and use an already cleaned and dry pair of tweezers to pinch an anther from the chosen pollen-parent and rub it onto the stigma of the selected mother-parent (photo D). If there



are more than two blooms to pollinate, I use two anthers, reversing the pollination sequence used with the first anther to make sure each stigma gets a good amount of fresh

pollen.

4. Protecting the mother-flower's stigma: Pollinating insects get up much earlier than I do. So there's a need to keep the stigma pristine until we dab the pollen of our choice. (There seems to be evidence suggesting crosses made at the warmest time of day produce better results, so I usually dab pollen sometime after lunch). My wife Sandy was an immense help in suggesting, then manufacturing, small bags of netting that are tied around the bud just before it opens. The bud thus opens within this "baggie" and is completely protected from any insects. (photo E). Sandy made the "baggies" from bridal veil material. Quite poetic, isn't it, with all that flower-related honeymoon activity going on!

When removing the "baggie" to dab pollen on the opened flower, it's an excellent time to collect pollen from this flower if you plan to use it for a specific cross in the future.



Carefully pull off all anthers and place them in a glassine envelope for future use.

After pollination, the stigma once again has to be protected from insect cross-pollination. This is easiest done by wrapping some tinfoil around it. Some hybridizers pre-cut some small squares of tinfoil that they wrap around the stigma's head after pollination. My fingers do not work well with thin, slippery pieces of tinfoil in the sometimes windy garden. So before hybridizing season, I cut about 200 of these tinfoil pieces and roll them into small cylinders with the help of a small Phillips-head screwdriver (photo A). Pinching one end shut gives me a perfect cap that I slip over the stigma after

pollination (photo E).

5. Recording the cross: I record an abbreviated version of the cross I just made on a 5-inch plastic tree-tag (photo B and “Data I Collect”, above). Other hybridizers may record their crosses in a hybridizer notebook and assign a multi-digit number to that specific cross. Marking the cross made in the garden thus is possible on a much smaller tag. However, as I walk through my garden I prefer to read the tag and know the parentage without having to go to a written notation. It’s the price one pays for an ever-shrinking memory...

If you use the same cultivar’s pollen on more than one flower of the same plant, one tree-tag wrapped around the stem suffices. But I often use pollen from different cultivars on the same (floriferous) mother-plant. Simply add another tree-tag to the mother-plant with the pertinent data. Since blooms open up from bottom to top, the identifying tag for the second cross is tied above the first tag. I mark each tag with a number that corresponds to the number of flowers pollinated. At harvest time it’s then easy to differentiate the pods of the first cross from those of the second cross.

6. Marking pollinated flowers: Sometime after the seedpod starts swelling, the anther will fall off, together with the tinfoil that marked the cross we made. So right after pollinating a flower, we need to mark this future seedpod in some other way. An easy way is to wrap a small piece of green twist-tie around the pedicel of the pollinated bloom (photo D). When seed-pods are ready for harvest, it’s quite easy to differentiate between the specific cross pods and other, critter-pollinated pods. That allows one to collect both specific-cross seed as well as OP seed from the same plant.

There is some discussion that “too many seedpods on a

plant will exhaust it and cause it be an under-performer next year”. I let quite a few of my martagons grow as many pods as mother nature will let it and have not observed a noticeable difference.

So there you have it! The ABCs of martagon hybridizing! There’s no excuse for not creating Martagon seeds. They are as easy to create as any other seed. They just take a bit longer to show results. And if you are wildly successful and don’t know what to do with all those seeds? There are Seed Exchanges in the US, in the UK, in Germany, in New Zealand, in Tasmania, etc. etc. They’ll be very grateful for your donation of extra seeds. And remember, it’s the journey that makes us grow, not just the destination.

Note 1: “Garden Marker” brand pen with a fine point from DP Industries (www.dpind.com) is much less prone to washing out or fading than other markers.

Note 2: A Martagon hybridizing article was written for NSLS and NALS in 2006. That article was part of the NSLS 2006 “Martagons!” CD and included hybridizing data for a large number of Martagon cultivars. The data were helpful in indicating which cultivars might more readily produce larger numbers of viable seeds. Space restrictions in this newsletter prohibit the inclusion of these data. The CD was transferred to NALS and is now available for viewing on the NALS website (www.lilies.org) under ‘Sources’. Unfortunately, just before publication of this newsletter that data link was not active.