COLLECTOR'S ITEM

Mystacidium capense

by Brenda Oviatt and Bill Nerison

The Circle of Life

ONCE IN A while, something occurs that makes you want to revisit an old subject. For us that happened when Don Brown sent us a photo of his award-winning *Mystacidium capense* 'Carrie Chu' CCE-FCC/AOS, and rather than flowers, it was covered with a plethora of seed capsules. He let us use his photo of his spectacular blooming plant in our June 2014 "Collector's Item" article (Oviatt and Nerison 2014). Since ex-situ propagation of rare angraecoids is our focus in orchids, we thought this would be a good opportunity to show the life cycle of this lovely species in domestic culture. We are constantly surprised at how many orchid growers are unaware of the process of growing orchids from seed, and want to show one method with this special species. The variations to this process could require an entire issue of *Orchids*, so this will be an abbreviated version. Since writing our first article about *Mystacidium capense* we found that traditionally the plant was used as a protective and love charm. That too made us want to revisit this lovely species!

Brenda Oviatt and Bill Nerison

Certainly not all orchids are as great as this one — a well-grown, healthy plant with high-quality flower form and 555 flowers — but when breeding an orchid, choose the best one you are able because the progeny will show it. Take pride in your choice and create something worthwhile! With many orchids, it takes several years between pollinating a flower and having a blooming-sized plant. Not everyone has *this* spectacular a plant to use, but it helps to start with the best quality plant available.

When given an option, do not self-pollinate your orchid. In some circumstances there is not a choice; i.e. there are a limited number of endangered plants, it's a new species with an undetermined identity, it's only plant available, etc. Also, some orchids are self-sterile and just will NOT produce viable seed when self-pollinated. Occasionally, there will be autogamy or "spontaneous" pollination; and they self-pollinate without a pollinator. Every orchid is different. We have found many of our angraecoids inherently resistant to self-fertilization. Don tried to self-pollinate his *Mystacidium capense* without success. The next blooming, it produced all those capsules spontaneously (see photo under "Seed Capsules Ripening"). When the capsules were sent to a lab, they found that though the plant produced the seed capsules, there was no viable seed in them. It has been shown that *Mystacidium* may also suffer from some degree of inbreeding depression when self-pollinated and is therefore described as being only partially self-compatible.

The natural pollinator for *Mystacidium capense* is a hawk moth. Some orchids trick their insect pollinators to visit,

'Carrie Chu' CCE-FCC/AOS, was the highlight of our June 2014 "Collector's Item" article.

[2–3] We show pollination of a larger angraecoid: in (2) note the "paired" pollinia; in (3) note the location of the stigmatic surface below the beak-like rostellum.

[4] This is the photo that inspired us to

but mystacidiums reward their moth pollinators with nectar. The type of nectar (*Mystacidium capense* nectar is mostly sucrose) and the length of the spur (up to 2⅕ inches [6 cm] on this species) attracts a single species of moth. Hawk moths use "energetically expensive" feeding techniques and require relatively dilute nectar. During a study of mystacidiums, one captured hawk moth had 20 pollinaria attached to its 2⅖-inch-long (6.15-cm-long) proboscis. Because we do not have this species of African hawk moth at our beck and call, we do our own pollinating. Most of the angraecoids, including *Mystacidium capense*, are fragrant in the evening and at night, using that fragrance and their light-colored or white flowers to attract their pollinator. Bill waits until the flowers begin to emit this fragrance to pollinate them; mimicking the timing in nature to help ensure success. Though we show Bill pollinating another angraecoid (*Plectrelminthus*), the process is pretty much the same for the *Mystacidium capense*, just on a much smaller scale. Bill uses a forceps from the lab to do this. A toothpick works too. The pollen is removed from beneath the anther cap and is placed on the stigmatic surface of the orchid. There is enough pollen here to pollinate several flowers; there are two distinct pollinia and each could be cut into pieces. You will know pollination was successful when the ovary (the area behind the flower) begins to swell.

THE CAPSULE Seed capsules are the fruit of the orchid — the most familiar orchid seed capsule being the vanilla "bean" (the brown specks in good-quality vanilla ice cream are the seeds). Orchids have the smallest seeds in the world and they produce millions of them in each capsule! We have not found a count done on *Mystacidium capense*, but 0.035 ounce (1 g) of seeds of *Aerides odorata* contains 3.4 million seeds (Stuppy [no date]).

We have had orchid capsules mature as quickly as three weeks (a *Cynorkis*) and up to 14 months (*Angraecum obesum*). For some species, ripening time is readily available in published form and online. This information for angraecoids is less common to find. The seed capsule tends to change color just before splitting. If you are going to "plant" the seed via a green capsule, it must be done just prior to splitting. Once the capsule has split, contamination is introduced and the planting must be done as dry seed. We have had success doing both, but will say that it is easier to sow with a green capsule than to decontaminate dry seed


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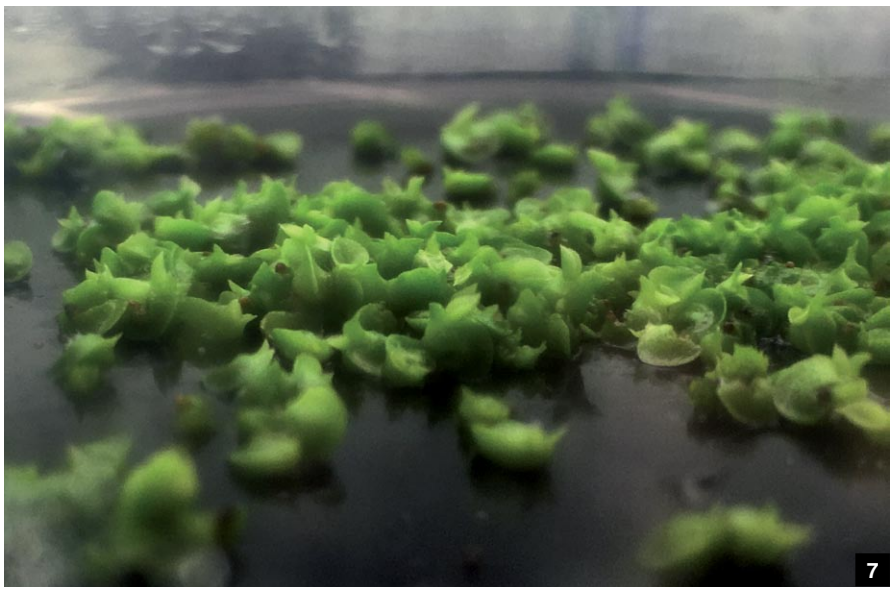
without damaging it.

ORCHID SEED For this article, we are showing dry seed. Capsules of our *Mystacidium capense* outcross (we used pollen from one plant to pollinate flowers on other plants) ripened at a time when Brenda was unable to work in the lab, so a capsule was set aside in paper for a time. Often when the capsule splits, part of the seed stays protected and hidden in "maternal fluff" and in nature, the fine dust-like seed is then disseminated in the lightest breeze. Most orchid seed does not travel a great distance; rather they produce an abundance of light seed so that it has a good chance of coming in contact with the fungus it needs to germinate (more details under "Germination!"). That said, it has been documented that orchids were among the first pioneer species to resettle on the islets of Krakatoa after the catastrophic volcanic eruption of August 27, 1883, so they can travel long distances.

The majority of seed we work with has a fairly smooth outer coating. When removing the dry seed, Brenda uses glossy paper beneath so it is easy to transfer the seed to a microcentrifuge tube for disinfecting. *Mystacidium capense* seeds are like miniature burrs, covered with little spines that enabled them to stick even to this glossy paper. Why? Nature always has a reason and we assumed that this is to stick to smooth surfaces in its natural environment. A common host plant for *Mystacidium capense* is the candelabra *Euphorbia*; perhaps these seeds are able to attach to the less-woody new growth of this host. These little appendages may also aide in wind dispersal.

GERMINATION! Orchid seed has no endosperm, the "built-in" food source that most seeds possess. This also makes them nearly weightless and most (though not all) orchid seed is dispersed by wind. But, by not having food, most orchid seed must engage in a mycorrhizal relationship with fungus to begin the germination and help feed the seedling. Some orchids are able to pair with many different species of fungi in their natural habitat, but others are very specific. It reminds us of the complex relationship many orchids have with a single pollinator and the certain peril they face should their pollinator become extinct.

Without a science background, Brenda has done lots of research and tried to talk to as many people as possible about germinating angraecoids vs. other orchids. The "standard fare" of orchid media have not been a huge success with some of our angraecoids. Sadly, information about certain orchid species tends to be limited or secretly guarded. For our angraecoids, we have had seed germinate between two weeks and five months, and sometimes it never does. It is interesting to note that orchid seed will even germinate on the side wall of a flask, which means even having the nutrients in close proximity can help. Once the seed germinates, it is "replated" and is transferred to a different medium, containing nutrients for growth. This happens every two to six months or when the plantlets become crowded or outgrow the space. There can be 3–6 replates when plantlets are transferred to a container of new medium before ultimate removal from the flasks. We are just now growing our own *Mystacidium capense* from seed, but we suffered tremendous losses from waiting too long between replates with our *Mystacidium braybonae* seedlings. They seemed to resent root disturbance even in flask — and they are the most robust *Mystacidium* species in our experience.



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revisit *Mystacidium capense*. So many seed capsules, each with the dry remnant of the flower's spur hanging from it.

[5] Seed being removed from dehisced *Mystacidium capense* capsules.

[6] A bit of that seed magnified.

[7] The seed has germinated and now protocorms cover the nutrient-rich medium within the sterile flask.

[8] Recently deflasked seedlings of *Mystacidium braybonae* residing in the dew-point cabinet.

[9] A first-bloom plant of *Mystacidium*

SEEDLING ORCHIDS We have found many angraecoids whose most tenuous point in the life cycle is their removal from flask and their entry into the "cruel" world. We have often asked ourselves how they ever manage to survive in nature, and it goes back to that part of the circle of life where we learned that millions of seeds are produced in each capsule. Nature can be a harsh environment and it takes that many seeds to produce a reasonable number of offspring; many, many losses occur along the way. We have built a dew-point cabinet, which has lessened the trauma, but there is still a group of plants (typically the most rare ones) that struggle upon removal from flask. As an experiment with the neglected *Mystacidium braybonae* (that went too long between replates), we put them in the dew-point cabinet without touching their roots. They have done better with this lessened root trauma.

FIRST BLOOM If your *Mystacidium capense* has reached this point, there has been approximately six months from pollination to harvest, one to three months for germination, up to two years in flask (experiencing numerous replates), and six to nine months to reach this point, assuming all goes well. A GREAT grower like Don may achieve this goal more quickly than the windowsill hobbyist, but the process is still rather slow. Also growing outdoors in a tropical or semitropical environment vs. growing in a greenhouse in an extreme environment will certainly affect the growth rate. As discussed in our 2014 article, we have experienced our greatest losses with this species during cold (0 F [−18 C]), cloudy winters in our Montana greenhouse. Global warming may be affecting things as we are not now experiencing this weather. Our brighter and warmer-than-typical winter days are yielding growth on the mystacidiums despite our shorter northern latitude days.

Finally, the circle of life brings us back to Don's *Mystacidium capense* — though in reality, he mentioned that the plant fell off its mount last summer, and he divided it. This magnificent multigrowth specimen is now multiple plants. That is another way to propagate this species (though slower and with fewer plants resulting than from seed). This must, however, be included in the circle of life for a *Mystacidium capense*. In nature, a mature plant may fall to the ground and be eaten by a passing herbivore; part may catch and take hold on another branch or some passerby may give it a new home, possibly to someone as a love charm.

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Reference

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Additional Reading

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Acknowledgement

We owe great thanks to Don Brown for keeping in contact with us and sharing this special plant with so many orchid growers. Those in southern California should feel honored to have seen this beauty in person!

— Brenda Oviatt is an artist and Bill Nerison is an architect. They live on the Clark Fork River in Missoula, Montana (a corner of paradise), with their daughter Marisa, son Tristan and an assortment of animals. They have been growing orchids together for 33 years and in that time have grown in many settings. For the last 13 years, their orchid growing has focused on the ex-situ propagation of endangered angraecoids and the education of hobbyists and growers (website: botanicaltd.com).

[1] This plant, *Mystacidium capense*; this is one of the plants we used when creating our "outcross."

[10] A close-up photograph of the individual flowers of this beautiful, rewarding species.