

The Bulb Garden

What's Inside...



~ Gardening with Bulbs ~
January 2024

Slugs

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Robin Hansen owns a small specialty nursery in Southwestern Oregon, inland about 14 miles from the Pacific Ocean. She has been the editor of *The Bulb Garden* for more than six years. She gardens in *Slug Paradise*.

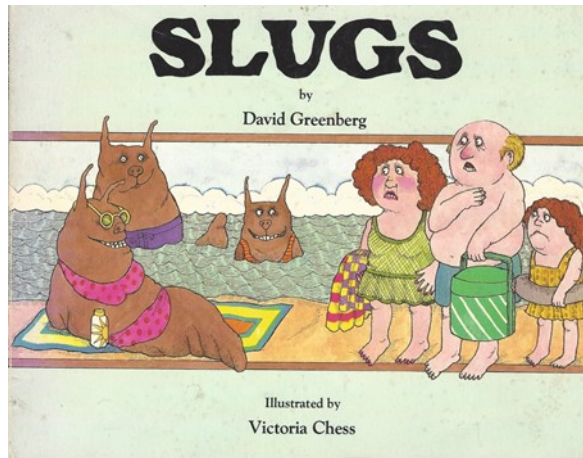
Probably the single most plant obnoxious predators in even slightly humid, rainy regions are the slug and its close cousin, the snail. Slugs are distinctive for their slime, disgusting upon accidental direct contact, for their incredible fecundity and wide range in gardens and in unexpected places, and for the number of often murderous methods used to combat them. The best reference I've come across, by David George Gordon, is *The Secret World of Slugs and Snails*, published in 2010 by Sasquatch Books.

In the northwestern United States, the most remarkable species is the iconic banana slug, a large (to ten inches long), mostly forest-dwelling creature, gold with black spots or plain dull gold, with a large air hole on the side of its head. In our gardens they eat the occasional treasure, but they more often munch on decaying material and algae.

Two of the most common slugs found in western American gardens are *Arion rufus*,

mostly chocolate-colored with an orange foot, and the diminutive milk slug, *Deroceras reticulatum*. The chocolate slug usually doesn't grow much longer than two to three inches, and its solid body color shows longitudinal corrugation. The black slug, *Arion ater*, looks similar to the chocolate slug; I've seen it only in Rainier National Park, Washington state. My daughter, on seeing it for the first time there, wanted to bring it home. She thought it looked exotic; you know the end of that story! The most common in my garden in southwestern Oregon,

and by far the most annoying, is the milk slug, which is about half an inch long and light tan, somewhat mottled, and very slimy on the surface; it leaves a "milky" trail.



This little book was given to me many years ago by a quirky, slightly twisted close friend. Not for the squeamish, but hilarious in its way considering the subject.



Deroceras reticulatum or Milk (y) Slug.
https://en.wikipedia.org/wiki/Deroceras_reticulatum

Slugs cont'd ...

The European garden snail, also known in the US as the California brown snail, is a dreaded invader which was introduced to California as a food species. If I didn't keep it out altogether, it could earn me an embargo on shipping plants out of state. Many states require a state Department of Agriculture "brown snail certificate" to import or export nursery stock in soil. I ship my bulbs bare-root, so this has not been a concern.

SLUGS' PREFERENCES

Not all geophytes, or all parts of the plants, are eaten by slugs. For example, they don't eat *Narcissus* or *Galanthus* foliage, but they eat the flowers. All the Hyacinthaceae seem impervious. Slugs nibble on *Colchicum*, but not fatally to either slug or plant; certain *Arum* species attract

worse damage. Damage to *Fritillaria* is more likely caused by cutworms, not slugs. *Tulipa* can suffer in both leaf and flower. We have no experience with slugs in collections of South African species, however. A few plants in the Ranunculaceae are ungrowable in slug-ridden gardens, including *Adonis* and *Glaucidium*, but *Anemone* species aren't touched.

Slugs are active mostly at night and in the early morning, spending the sunlit hours hidden in moist crevices. The spaces between and under pots are favored, so it's wise to lift and examine your potted plants often. Slugs can also crawl up through the drain holes and hide inside a pot. When clay pots are plunged, the niche under the rim is a favorite lair. They may crawl upward and rest on the underside of large leaves or greenhouse shelves.

Slug populations in the garden can vary from year to year. Unusually long, severely



Arion rufus. Wikimedia Commons.

cold periods can kill both adults and their eggs. Parts of the garden that receive no summer water won't appeal to slugs, a strategy possible in dry-summer regions.

CONTROL

Some time ago, I posted to the PBS email discussion list, asking about others' experiences in different seasons, what species they see, which plants they find most vulnerable, and what control methods they use. We should remember that many of these little animals are imports, so I hope we can distinguish between native and European slugs and their respective habits. Slugs, we should admit, do have a beneficial role in the garden, being extremely effective at digesting certain kinds of organic matter.

Control methods change, as do the preventive measures we are allowed to purchase, and our gardens change too. We may stop growing some vulnerable plants and find others that are less susceptible. Several respondents mentioned the value of slugs as food for other animals, such as snakes and birds.

Many of the PBS members who answered my questions try to use the least toxic controls possible, and resort to mechanical

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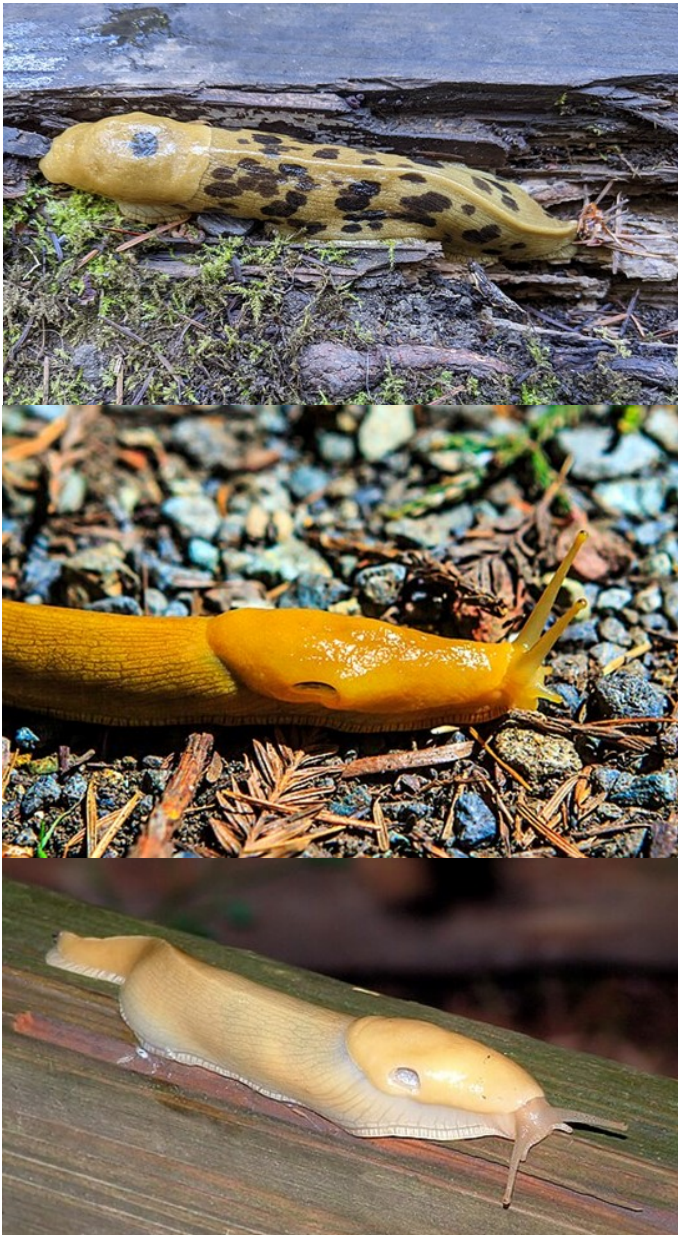
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Slugs cont'd ...

solutions such as hand-picking. One recommended laying corrugated cardboard or a flat board on moist ground to offer a lair, then lifting it during the day to dispatch the somnolent slugs. Generally, gardeners recommend going around the garden when slugs are active at night or very early in the morning, removing the slugs from plants, and dropping them into a container of water and detergent solution. The detergent disrupts the slug's surface so it sinks and drowns. One correspondent noted that the gardener thus becomes a predator of slugs, but



Ariolimax sp. The familiar "Banana" slug of shady, moist places and woodlands, not considered a garden pest... Wikimedia Commons.

also that it likely would take five years to cause a significant population reduction.

One of the oldest ways to kill slugs is feeding them beer in a shallow container. Several contributors reported that it really does work. They recommend burying the container to near the rim. However, one noted, "It means going around and emptying the traps of dead slugs on a semi-regular basis; and this method also captures and drowns beneficial predatory ground beetles." An Oregon State University research team and colleagues tested a number of slug attractants and found that the top one was actively fermenting bread dough. It can be used as dough balls under a protective cover, or as a thin, bubbling liquid in a container buried to the rim. Here's a link to a paper on the topic: <https://ncbi.nlm.nih.gov/pmc/articles/...>

Commercial slug baits worry some gardeners who fear they will harm birds and pets, but restricting their use to the greenhouse can prevent this. In recent years baits with iron phosphate as an active ingredient have become popular for garden use because they don't threaten pets and wildlife (other than the slugs and snails). The same is true for more toxic products that can be even more effective in protected contexts. The iron phosphate products such as Sluggo™ are hard pellets, and they don't seem to be consumed by very small slugs. Also available is an iron phosphate spray that can work for up to two weeks, even with rain. Some iron phosphate products, however, are augmented with spinosad (also certified as organic), which is toxic to poisonous to non-targeted insects, including honeybees, that might come in contact with it.

One old standby, Corry's Slug Bait™ is most commonly used as a pellet; made with metaldehyde, there is also a loose coarse powder, but I haven't seen it and wouldn't use it as it's harder to control applications. This product is also rain-resistant; while there is a caution regarding dogs and cats, I've never had an animal interested in it. The pelleted products are spread thinly. I've found them effective without the need to gather and dispose of carcasses. Much to my surprise, slugs are

Slugs cont'd ...

quite carnivorous creatures which does keep things tidy.

Ordinary table salt is toxic to slugs that touch it. Where plants are on a table or moveable bench, you can place containers of strong brine under the legs to prevent slugs from climbing up. Old gardening books may recommend patrolling the garden, salt shaker in hand, and sprinkling the pests, but this may result in a lot of wasted salt and even damage to plants. A similar solution is to spray slugs with a mixture of water and ammonia (1 part ammonia to 6 parts water—my mother used 1 part ammonia to 3 parts water to good effect). As long as the mixture is not too strong, it should not burn most foliage. Avoid using ammonia made for cleaning, which also contains soap and perfume. The ammonia strips the slug's protective mucous layer.

Physically repelling slugs from vulnerable plants is the principle of several methods. One contributor wrote, "As Volta discovered many



Northern Redbelly snake, *Storeria occipitomaculata occipitomaculata*. Wikimedia Commons.

years ago when he invented the electric battery, if you put zinc and copper in a solution, they create a weak electric current. When the slug or snail touches two such wires with its wet slime, climbing toward your plants, this generates a current that deters them." He set up a brick with the two wires at the bottom, but it wasn't clear whether this was a support for a potted

plant or an actual barrier. A collar of copper sheet is said to have the same effect, but it must be kept clean to work, which is difficult in



There are a number of species of *Thamnophis* or garter snakes (commonly corrupted to garden), all quite variable in patterns and colors and with a center back stripe. Our most familiar snake in the western U.S. is *T. sirtalis*, above. Wikimedia Commons.

the open garden.

I've found that a mulch of small, sharp crushed rock is really very effective, and I've used that and oyster shell to mulch around pots. A rock garden, typically covered in gravel and rocks, can repel these slimy critters, but moist crevices are custom-designed slug lairs. C. J. Teevan wrote, "Diatomaceous earth is a pain in the neck but it's very effective. You have to reapply every time it rains, or if you get the stuff wet. Coffee grounds, to my surprise, also work, and they attract earthworms as well as amending the soil." He used coffee grounds as a mulch around lilies. Another contributor, however, noted that caffeine is toxic to amphibians, so it's best to avoid using coffee material where they are present. Wood ashes and sheep's wool have also been claimed to repel slugs.

Slugs do have their own predators, and these can be encouraged. Mark Akimoff wrote, "The garter snake is also known as the gardener (or garden) snake because it's so beneficial in the control of not only slugs but many other

Slugs cont'd ...

pests as well. Anything you can do to attract snakes into the growing area is very beneficial.” Other snakes mentioned as good slug predators include Northern Redbelly snakes (*Storeria occipitomaculata*) and DeKay's brown snake (*S. dekayi*). Kathleen Sayce described a way to encourage these predators: “Friends use a 3-4-year cycle from new to finished compost. The piles are constructed with woody branches and twigs layered with green material from the vegetable garden. They locate the piles in sunny areas, and cover each with a small tarp anchored with pavers to provide basking surfaces. Every year they spread the pile of finished compost and start a new one. The snakes move from pile to pile. Slugs, snails and voles are not a problem in their garden.”

Teevan also wrote, “My favorite solution of all time: fireflies. Firefly larvae *love* to eat slugs.” Fireflies aren't present in all parts of North America, but where they are, gardeners could learn to recognize and protect their larvae. He also mentions frogs and possibly free-ranging chickens. There are even species of slugs and snails that prey on other slugs, but some of them are omnivores that also damage plants. Ducks are commonly recommended in British garden books, but as Diane Whitehead wrote, “I've had great amusement and joy from free-ranging ducks. Such exuberant creatures. I didn't take note as to whether they ate slugs, but they sure ate a lot of other stuff.”

One method I almost hesitate to mention as few gardeners will admit in public to using it (because the response is so often negative as in “oh, ick”). I simply cut them in half with garden shears and leave the pieces for their fellow cannibals. Shears will need cleaning, of course, but this is not my standard method, unless I run out of pellets.

In conclusion, there are many approaches to this problem, and most gardeners have tried more than one. It's good to remember the practice known as Integrated Pest Management, in which we first observe and analyze the nature and extent of the pest problem, learn more about it, and then use a combination of techniques: growing

appropriate vegetation, limiting pest habitat, encouraging natural predators, and attacking directly with mechanical (hand-picking) and chemical controls. Keeping slugs out of our plant collections is probably a hopeless goal, but limiting their impact is a real possibility.



Slug damage on Iris. Wikimedia Commons.



From the Editor:

I've lost track of the number of years I've been editor, but I do know that I could not have done my job without the support of many people, members and non-members alike. Most particularly I want to thank PBS board members for their steadfast support, ideas and patience. Jane McGary with her professional editing skills, Arnold Trachtenberg who made sure the journal went to the printer and then sent them to our members and the ever-willing writer Johannes Ulrich (Uli) Urban who provided advice, contacts and ideas are folks I've turned to, often at the eleventh hour. They've saved me more than once.

I look forward to seeing the changes a new editor will bring—new ideas, new bulbs and a future transition to online journals among others.

I hope you've enjoyed the articles as much as I've enjoyed tracking them down and learning all manner of new knowledge about plants, people, and gardens, not to mention improving my editing skills (or so I hope).

My best regards to all of you, Robin Hansen

Nerines at Exbury Gardens, UK

Johannes Ulrich Urban was very lucky to be invited to view and tour the Nerine collection at Exbury Gardens in southern England. Following is his account of his tour.

At the end of September 2022, I was invited to visit the Exbury Nerine Collection in Southern England. Unfortunately, it was a little too early to see the glorious display of the entire collection in simultaneous bloom but this was largely compensated by the warm welcome of the owners Nick and Lionel de Rothschild and the gardener in charge of the collection, Theo Herselman.

My visit started with a guided tour through the estate which is famous for its Rhododendrons and Azaleas and many rare mature trees. The gardens have a favourable microclimate being close to the sea and the unique setting includes the Beaulieu River as a natural boundary

on its western side. During the tour led by Lionel, he explained in brief the history of the gardens: they were started by the family in 1919 and now the 4th generation is involved, Lionel's niece Marie-Louise Agius.

Before the Nerines themselves were seen, Lionel's brother Nick showed me the Five Arrows Gallery, which was being prepared for the coming nerine show. Imagine an art gallery set to one side of the gardens, dedicated at this time of the year to show the range of Exbury nerines displayed there when they are at their best. To show the flowers to perfection, the interior walls are all black, with carefully sited spot lighting. The flowering plants are placed on staging at different levels, and the structure of the stage is also covered in black fabric. The light is directed onto the flowers and brings out



Nerines cont'd ...

their crystalline glitter to perfection, with the sparkling that is so characteristic for *Nerine sarniensis*. This display is really worth a visit at flowering time. On the walls there are various posters of *Nerine sarniensis* in their natural habitat with botanical information on the species and informative and colourful pictures.

Then Theo took over in the large greenhouse dedicated to *Nerine sarniensis* and its hybrid cultivars, as well as other nerine species. Theo is an expert in growing these bulbs and is brimming with enthusiasm. All of the mature bulbs are grown in one and two litre square black pots and are placed on large greenhouse tables. Theo has experimented with numerous different mixtures and composts and has now settled on John Innes no. 3 but he is



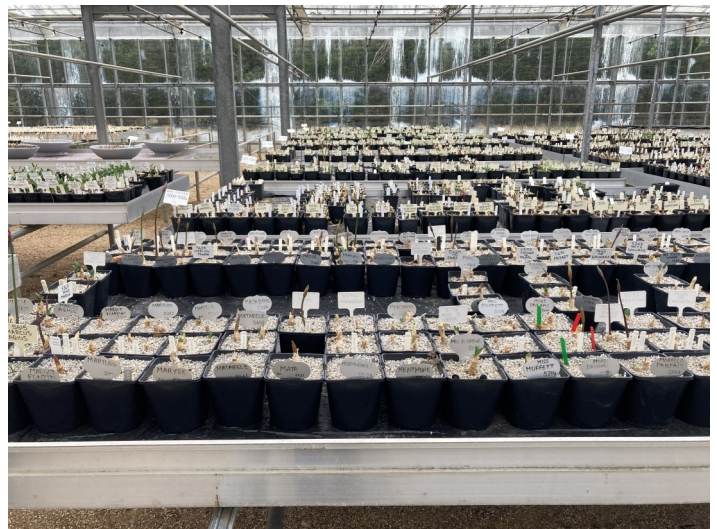
Theo Herselman in a glass propagation house. Theo is in charge of the nerine collection at Exbury.

still looking for something that will remain damp for two to three weeks. Theo tries to repot every five to ten years based on observations and assessments. Nerine resents root disturbance and grows best when tightly packed in a not too large container. Dormancy is induced in mid-April when the leaves start yellowing and the temperature starts warming up, at which point Theo stops watering entirely and does not start watering again until mid-August. The summer in 2022 was particularly warm in Southern England, and as a consequence the flowering of the collection started almost 4 weeks later than previously. This meant that I have only seen some of the

very early varieties and more in bud than in flower but compared to the necessity to reschedule arrangements and events, this was only a minor drawback.

Theo has introduced a numbering system: every cultivar bears a number under which it is identified; only the very best forms will be named in due course. This code helps to organise, document and keep track of a very large collection of over 1200 numbered cultivars, of which about 700 have been named.

Mature bulbs usually flower before or with the emerging foliage (in botanical terms they are hysteranthous) once the temperature drops in autumn and the difference between day and night temperatures increases. Water at this stage is applied weekly. There are early, mid-season and late flowering forms which extend the display. The original species flowers in bright orange and occasionally white but



the cultivars range from pure white to a dark, almost blackish, purple with all shades of pink, red, orange, mauve, purple and magenta in between. A whole large greenhouse in simultaneous bloom is quite a sight.

How exactly are the Nerines being grown at Exbury? All *Nerine sarniensis* and their cultivars are grown under glass year-round. As they are winter growing and summer dormant and not considered frost-hardy they would not be suitable for outdoor

Nerines cont'd ...

cultivation in Southern England, contrary to *Nerine bowdenii* and its cultivars which are hardy summer growers. The composition of the substrate was mentioned above.

After various experiments, Theo now gives the leafless bulbs no water at all during dormancy. Once watering has begun in mid-August, the pots are not allowed to dry out but on the other hand overwatering or stagnant water is of course strictly avoided. All watering is done on daily observation and analysis of the requirements.

Many of the flowering bulbs will set seed. Theo said that this is particularly the case with those specimens which are brought into the Nerine gallery display because of their greater pollination due to them being moved around more. The seed is sown as soon as it is ripe. As every year a large number of seedlings are raised, the collection increases and once the youngsters have reached flowering size after several years, selection will take place. There is also some hand pollination carried out using the best forms as parent plants. This way the collection is constantly improving.

Once in full leaf the plants are fertilised with a seaweed soluble fertiliser containing balanced N-P-K and various other micronutrients. This is watered on at least once a month but may be more often, depending on observation, until watering is stopped in mid-April. Watering is stopped once the foliage shows signs of yellowing. Dried leaves are removed as soon as possible between June and July. Besides the Nerines, there is also a collection of *Lachenalia* species and hybrids at Exbury.

In 2022 the owners of the collection made a generous donation of many bulbs and offsets to the EU bulb exchange of the Pacific Bulb Society. On behalf of the membership, I thank Nick and Lionel again for this generous gesture.



Nerine sarniensis, one of the species in the parentage of so many hybrids created at Exbury Gardens. Wikimedia Commons.

Editor's note: Nerines will be found from time to time in the PBS seed and bulb exchanges. They are native to South Africa and consist of 20-30 species, both evergreen and deciduous, typically flowering in autumn. They are widely grown and hybridized, resulting in an amazing range of colors. *Nerine sarniensis*, *N. bowdenii*, *N. masoniorum*, and *N. undulata* are the most frequently used in hybridizing.

Exbury Gardens is a private garden open to the public in southwest England. They are not a commercial grower but have perhaps the largest collection of Nerine in the U.K. The Nerine put on a spectacular display in the fall, the best time to see this collection; they also have a collection of *Lachenalia*. Their website is: www.exbury.co.uk.



A pink *Nerine bowdenii*, one of many colors seen in *Nerine* hybrids, among the lavenders, corals and whites, to name a few.

Microwaving Pollen, an Update

Johannes Ulrich Urban is a member of the PBS board and with Martin Bohnet runs the EU Seed and Bulb Exchange. A regular contributor, this is a revision of a previous PBS article and was recently published in the Indigenous Bulb Association of South Africa's newsletter.

Albuca clanwilliamigloria is the queen of the genus with tall (apparently up to two meters) inflorescences of bright golden yellow flowers. They do not have the green stripe on each petal which is so typical for *Albuca* flowers so their colour is a true yellow. The flowers are hanging and may be the largest in the genus. This makes it a very attractive garden subject, especially if more than one individual would be in flower.

It was described and named by the German botanist couple Ute and Dietrich Müller-Doblies and named to honour the town of Clanwilliam in South Africa where it grows nearby. Both botanists are incredibly dedicated to botany as an old school science. Ute Müller-Doblies told me that this particular *Albuca* grows within thick tussocks of *Restio* which serve as some kind of natural staking for the very tall and somewhat lanky plants. There may well be



other benefits of being housed in the extremely dense and hard rootstock of a *Restio*.

I was very pleased to be able to share seed of this very beautiful plant. I only have one single bulb which travelled forwards and backwards between my friend Chris Lovell and myself, it is the only survivor of a batch of seedlings originally grown from Silverhill Seed. In spite of many attempts over the years by both of us the plant seems to be self sterile and we never had any seed set.

After a lot of online correspondence with several knowledgeable people and many trials I got the right technique to microwave the pollen to overcome self incompatibility and achieve a good seed set in May 2021.

The seed proved viable. After sowing in autumn 2021 there was a near 100% germination and the young seedlings grew on nicely, being protected from slugs. After the first dormancy they were potted up into a larger container and have again gone dormant in late spring 2023. This particular species needs several years to reach flowering size from seed. The seedlings look distinct and uniform.

Albuca clanwilliamigloria has the winter growing pattern of South African bulbs. Older bulbs may remain dormant for more than one season, though, which is typical for many bulbs from dry climates. This is a test of their gardener's patience... The mother bulb has not sprouted for two consecutive seasons after seed set but was healthy looking on repotting in autumn 2022.

For those interested in the details, here is the "recipe" for microwaving the pollen. It combines the advice from different people. The description of the full procedure including pictures is to be found in the WIKI of the Pacific Bulb Society: <https://www.pacificbulbsociety.org/pbswiki/index.php/Microwave>.

To collect the pollen I use a (non-metallic) cotton swab (Q-tip). I do not remove the anthers from the flowers. The swab with the pollen on it is placed in a drinking glass with about 1 cm of water in the bottom; the swab points upwards and has no contact with the water. The glass is placed on the edge

Microwaving Pollen cont'd ...

of the rotating plate of the microwave oven with a mug of water on the opposite edge, as far apart as possible. Microwave at max power, which is 700W in my case, for 10 seconds. Then I collect additional fresh pollen with the same microwaved swab and with this mixture I pollinate, preferably young flowers before they are fully open. I carefully open the 3 inner petals to get to the stigma.

I also pollinate mature flowers. Afterwards I keep the swab dry in the same glass without water on a sunny windowsill and repeat the process every day with the same cotton swab which contains some old pollen from the previous days. This combines the different advice I got, but I do not know which of the combined actions taken is the key. Success rate with this procedure is good; about 75% of the flowers have formed a seed pod, the others aborted. The resulting seed was sown and shared on different occasions.

The Pacific Bulb Society has currently set out a grant of 600 US\$ for further research into microwaving pollen to overcome self-incompatibility.

Editor's note: Since this article was written those funds from a generous member donor remain available. If you have questions or are ready to submit an grant application, please contact a PBS board member. It's advised to read the information provided by the link in Uli's article above prior to application.



Crocus 'Yalta', a Janis Ruksans hybrid. Photo: Mark Akimoff.

Crocus 'Yalta'

Mark Akimoff is the new vice-president of the Pacific Bulb Society, an enthusiastic bulb grower and nurseryman (Illahe Rare Plants, Salem, Oregon), an avid hiker and botanist as well as a far-flung traveler.

Crocus 'Yalta' is a charming and vibrant flower bulb known for its early spring blossoms. Characterized by its distinctive, two-toned, violet-blue petals with contrasting orange stamens, this cultivar adds a splash of color to gardens and landscapes. The flowers emerge in late winter to early spring, often peeking through the last remnants of snow, signaling the arrival of a new season. 'Yalta' is a hardy and resilient variety, adapting well to various soil types and climates. On the edge of the rock garden, it adds that splash of color for the early season often in bloom before the earliest of the narcissus in my Western Oregon Garden.

An early flowering hybrid between *C. tommasinianus* and *C. vernus*, both of which have native ranges through the European high country. 'Yalta' was selected by Janis Ruksans, the renowned Latvian horticulturist and bulb expert known for his extensive work in collecting, cultivating, and breeding various bulbous plants, particularly crocuses. His passion for bulbs led him to explore remote regions of Asia, including the Caucasus and Pamir Mountains, where he discovered and collected a diverse range of crocus species.

With easy growing, amenable parents, this selection has a nice habit of naturalizing in most any situation and would be a great candidate for the bulb lawn where it can thrive in summer dry meadow conditions. It even seems to tolerate my heavy clay soil, where, when given a sunny spot, it will often be amongst the first of the February flowers to begin the new season of color.

ANNOUNCEMENTS



ATTENTION PBS Members

CALL FOR SPECIAL GRANT APPLICATIONS FOR MICROWAVE POLLEN STUDIES

A PBS member has donated funds to be used specifically for the study of microwaving pollen to enhance or encourage pollination of difficult to cultivate bulbs, those in particular that rarely set seed, are self-sterile or set seed so poorly as to be unreliable to propagate by normal methods; in addition it is also suggested that a comparison of the genomes of parent and progeny, especially regarding expected increased homozygosity in the progeny. A link to further information which will provide some background information is at

<https://www.pacificbulbsociety.org/pbswiki/index.php/Microwave>

There are some specific requirements for this grant, including a requirement to write an article for the *Bulb Garden* at the end of the study. For further information, including conditions, please contact a PBS Board Member at one of the email addresses on page 2 of this journal.

Our standard grant application will be required. Please go to the Pacific Bulb Society website at:

<https://www.pacificbulbsociety.org/pbsforum/index.php?page=grant>

Applications should be emailed to a PBS Board Member. There is no deadline established for application for this grant.

from
Pacific Bulb Society, Inc.
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The Genus *Hippeastrum*
(Amaryllidaceae)
in Bolivia



Raúl F. Lara Rico
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For more information, contact PBS at:
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Northern Redbellied Snake (*Storeria occipitomaculata occipitomaculata*) showing variation in color. Flickr - 2ndPeter.jpg Washington County, Missouri.

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Announcements

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The Bulb Garden is the newsletter of the Pacific Bulb Society (PBS). It is published, if enough articles are submitted, around the third week of each quarter and is available to PBS members. This newsletter provides gardening or bulb related articles, news of interest to members, and announcements of the PBS organization.

Editor: Robin Hansen, robin@hansenursery.com

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