Illinois Orchid Society Newsletter

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In This Issue!

President's Message

By Joe Dixler

Oliver Wendell Holmes said, "The great thing in this world is not so much where we are, but in what direction we are moving." Think about this statement. When you attend an IOS meeting, what are you doing while you are there? Are you simply listening to the speakers and enjoying the hospitality or are you participating and making progress? The real enjoyment of membership in our society can only be achieved by your involvement in its activities. As you know, what you get out of something is based on what you have put into it. You will get much more out of the experience if you contribute to it. So, my first message to you is, "Get involved, you too could be the president!"

You can join in the fun by:

- Asking **questions**
- Giving us your **ideas**
- **Talking** to others about their growing techniques
- **Learning** techniques to help you grow better
- Meeting **new people** you would not know otherwise
- Helping others with your **ideas** and **assistance**
- Bringing in **plants** for away shows & monthly judging
- **Volunteering** for jobs
- **Participating** in shows, eg, set-up, tear down, or clerking
- Preparing or helping prepare an **exhibit** for a show
- **Sharing** in the camaraderie by assisting with the **away-shows**
- Donating goodies for **hospitality**
- Gaining respect for your **achievements**

For blooms like this next season follow the culture advice inside.

LC. Mini Purple 'Karen Rockwell'AM/AOS [You may be able to see the color of orchid pictures such as this is the future. See page 2-

By taking some of these actions you will feel part of this society. Involvement is crucial to gaining the sense of belonging. And we need your help to have a successful society. So as the new president I state, "Ask not what your society can do for you, but what can you do for your society!" I hope the spirit of working together during our recent very successful 50th Anniversary Show will continue. The group that participated certainly accomplished a major undertaking through their cooperative effort.

To end this message I want to add a special thank you to **John Stubbings**, our past president, whose guidance during our recent show resulted in much praise from the American Orchid Society. I thought we would be saying good-bye as well as farewell to him, as his new job will take him to India for a year. But the United States government now considers this orchid paradise to be off limits for Americans. So we may be fortunate to have John's continued assistance for a while longer.

Future IOS Meetings

July 14	Chicago Botanic Garden
August 11	🍽 Picnic: Oak Hill Gardens
September 15	Chicago Botanic Garden
October 13	Chicago Botanic Garden
November 17	Chicago Botanic Garden
December 8	🍽 Holiday party at Hausermanns.

2002-2003 IOS Officers -- Terms of office are from July 1 until June 30			
President	Joe Dixler	847-432-7708	(jmd@dixler.com)
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Steve Lipson	2003	847-328-1837	(stevenlipson@attbi.com)
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Joel Edwards	2004	847-394-9251	
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Jim Spatzek	2006	847-498-4638	(jamcam@avenew.com)
Rich Unger	2006	773-685-2677	(ungerCFC@msn.com)

IOS Board Meetings

The first board meeting of the 2002-2003 Board will be held on July 2, 2002 at the home of Joe Dixler, Future board meetings will be published in the newsletter in advance. Board meetings take place bimonthly and all IOS members are welcome to attend. Please call Joe Dixler in advance.

From the Editor

With this issue, after many years of faithful service as newsletter editor, Jim Spatzek has terned over the rains of the newsletter to me. We all owe Jim a big THANKS for his devoted endeavors as newsletter editor!

I will be trying out different styles and articles in the months to come. Please email me ***suggestions comments, requests, etc.*** (See contact information for me and the entire Board above.) Also, please **contribute** to your newsletter with any articles, orchid tips, orchid trips/ adventures.

P.S. Wouldn't you love to be able to see the picture on the front page in color? Soon I will be creating the newsletter in an email format and the newsletter will have more **color**. If you choose to receive your newsletter via email, you: 1) receive the newsletter faster, 2) enjoy beautiful color photos, 3) save the society money. More info to come....

Barb Bennett, Newsletter Editor

Be sure to visit our website at ***iosoc.com***.

Upcoming Orchid Shows

The orchid show season kicks off at the Wisconsin Orchid Society Show, September 21-22, 2002, The Domes, Milwaukee, Wisconsin. Mark the date and be prepared to drop off your blooming plants on Wednesday and Thursday of that week so **Martin Taylor** can take them to the IOS exhibit. Better yet, take off Friday, September 20 and help Martin put up the IOS display. Putting up displays is fun and you don't have to know anything special, just be a helping hand. This show is only an hour away and is a good one to get your feet wet on. Contact Martin to let him know you can help him out.

If you can't help set-up or contribute plants, make the short 1-hour trip to Milwaukee for what is always a great show. (In fact, if you really want to see any show from the best vantage point, volunteer to clerk at judging. Judging is at 7 AM on Saturday, September 21.)

American Orchid Society Judging

The July AOS judging of the Chicago Center will be held July 13 at the Chicago Botanic Garden. The July judging is preceded by presentations of student judges' papers in the auditorium beginning at 8:30 AM, as listed below. The public is invited to attend. Plant judging will take place at 1PM.

The "Brother" Phalaenopsis	Brian Lang
Multifloral Phalaenopsis	Bob Lewis
Paph Armeniacum and Its Hybrids	Steve Troc
Orchid Nomenclature	Milt Wittman
Blue Cattleyas	Barb Bennett
Orchid Hybridization at a Major Orchid Firm-Past, Present, Future	Kathy Creger
Complex Paphiopedilums	Karen McBride

Conservation Begins at Home

The original habitats of many orchids have been destroyed and attempts to relocate species into new areas have met with limited success. There are many rare and endangered species and hybrids already in the collections of hobbyists. It may be possible to relocate these plants when their owners can no longer care for them, so they remain in cultivation. If these plants can be rescued and propagated, it will help to ensure their survival. A "Caretakers Program" is being discussed and is examining ways to designate qualified members to participate in caring for these rare plants.

A list of plants could be compiled and later published in "Orchids" and probably on the AOS website. A Caretakers sign is being considered and could be distributed to AOS members in a future Orchids Magazine. Your society liaison phone number could be noted so that the contact representative name is handy. Ways of giving recognition to donors are under consideration. Caretakers might propagate these plants so they can eventually be removed from the endangered list. Check the AOS website for more news on this exciting project. We encourage you to share any thoughts or ideas on this worthwhile endeavor. Here is a way every-one can participate in a meaningful conservation project. Contact Rosalie or Joe Dixler at 847-432-7708 or e-mail jmd@dixler.com.

Rosalie Dixler, AOS Representative

July Meeting

Our July meeting is on the 14th of the month and will be held at the Chicago Botanic Gardens. The meeting will begin promptly at 12:00.

The workshop this month will be a little different. We will have a representative of **Purple Clay Imports** showing and selling clay orchid pots that are crafted in China. These pots are wonderful and would make a nice display pot for your blooming orchids, instead of those plain green plastic pots we use to grow our plants in.

Our speaker this month will be **Tom Nasser** of **Carolina Orchids**. He will be speaking to on the culture and varieties of **Bulbophyllums**. Mr Nasser has a Ph.D. in Textile Chemistry and has been selling orchids since 1980. He has a wonderful collection of Bulbophyllums and will help demystify how to grow them. He will bring plants for sale and you can pre-order plants from him. Please check out his web site at carolinaorch.com or contact him by phone (803-548-1682). If you have never seen or grown a bulbophyllum you should attend this meeting. The flowers on these plants are some of the most intricate in the orchid world —ranging from the very beautiful to the most bizarre.

Wendy Holtzman, First Vice-President

Welcome New Members

Please extend a warm welcome to the following members who have recently joined the IOS:
Susan Tirzmalis – Glenview
Maureen & Richard Kellerman – Prospect Heights
David & Allison Tribble – Chicago
Scott & Katharine Manion – Wilmette
David Deverick – Chicago
Xuemei Yu & Rigen Mo – Chicago
Diane Meagher – Chicago
Joyce & Regina Crowe – Elmhurst
Howard Raik – Oak Park
Julie Hall – Chicago
Barbara Cervantes – Hoffman Estates

I would encourage our "old" members to introduce themselves and personally welcome these newcomers to our Society.--**Allen Morr**, Membership

CONGRATULATIONS TO THIS YEAR'S MONTHLY JUDGING CONTEST WINNERS!

While the number of plants displayed and their variety increased slightly this year, the number of participants did not. If you haven't brought plants for the monthly judging before, please consider sharing them with us next year. Sharing the results of your labors with appreciative friends is well worth the trouble of boxing, transporting, unloading, etc. We all can learn from each other, and most of us learn best visually! - so keep those plants coming.

The winners are listed below and are receiving gift certificates from Natt's Orchids this year. You will note that we had no "new" members in the Greenhouse category so there are 2 awards to "new"members in the Lightstand category. Also, there are more awards in the Lightstand category than Greenhouse because that is where the biggest percentage of our growers are located. Again, congratulations to all and bring those summer bloomers for the July start of the 2002-2003 judging season.

Sherry Maloney, Monthly Contest Chair

Greenhouse		
1st Place	Joe & Rosalie	1097
2nd Place	Dixler	278
3rd Place	Sue Golan	224
	Ed Gamson	
Lightstand		
1st Place	Martin Taylor	687
2nd Place	Wilfred Losert	650
3rd Place	Joel Edwards	480
4th Place	Barb Bennett	386
5th Place	Sherry Maloney	378
6th Place	Wendy Holtzman	321
7th Place	Rich Unger	292
"New" Lightstand		
1st Place	Rusty Jehangir	37
2nd Place	Ernie Gemeinhart	30

July/August Orchid Checklist

Cattleya

Cattleyas this month require careful attention to their watering and fertilizing needs owing to the probable high temperatures. Increased airflow lessens humidity and dries plants out more quickly, necessitating more frequent damping down and watering in areas where high humidity is not a problem. Higher light and heat require more fertilizer. The growths your plants are making now are the source of this autumn, winter and spring's blooms, so applying adequate fertilizer this month is the best way to ensure future blooms. Higher temperatures and humidity may also lead to fungal or bacterial rot problems, so it is important to closely observe your plants for any early indication of problems. Pests are also at a high point this month for the same reason.

Paphiopedilum

Cooling and air circulation are especially critical in these two months to prevent stress and avoid disease problems. Watering needs to be closely monitored to ensure that plants do not dry out. Warmer-growing hybrids will be at the peak of their blooming, with attention needing to be paid to staking of spikes. Look for water lodging in growths, which can rot emerging spikes and lead to the loss of the entire growth.

Phalaenopsis

Most, if not all, potting should be complete by now. This month and next are when these plants achieve their maximum growth. This growth will be that from which they set their spikes for the coming season. The more leaves the plants grow, the better potential for spiking will be realized. Lots of heat and light call for liberal applications of water and fertilizer.

Laelia purpurata

The flowering season of this plant is coming to an end, presenting a good time to repot. As soon as the new roots start to appear, clean off old bark and repot into a clean medium-grade fir bark. Place the plant in a little less light and higher humidity to relieve stress until it is more established, which is about one month after potting.

Cymbidium

Summer can be the most rewarding season for cymbidiums. Growths should be coming strong now. The leaves of the new growths are best when they are broad and fairly stiff. The color should be a light green to nearly yellow. Early flowering varieties should be showing flower spikes, so move the plants into a cooler area with lower light. For mid-season varieties, lower the dosage of nitrogen to assist in spike initiation.

Misc.

For cooler-growing plants, such as masdevallias, other pleurothallids and the like, the next few months will be a challenge. During the hottest times, keep your plants more shaded and be sure to keep the humidity level much higher. Do not let plants dry out. Delay re-potting until the weather cools.

Odontocidium

Many of the intergeneric crosses between odontoglossums and oncidiums, such as Odontocidium, Wilsonara and Colmanara, will be blooming now. Take special care to train the spikes for best floral display. Keep plants under fairly shady conditions.

Vandaceous Genera

Plants will be growing quickly now and really enjoying the hot humid days so similar to their native habitat. Watch for pests though, as many of these also enjoy the same conditions as the plants. Check flower spikes so that they can extend unimpeded for the best flower presentation later.

Orchid Q & A

Q. Three of my phalaenopsis plants have developed a kind of white, sticky, fuzzy goop on their leaves, front and back. One also has a spike with buds, and this goop seems to be on the spike as well. I assume this may be some kind of fungus. I have washed it off, sprayed the plants with a fungicide, and separated them from the other plants, but the problem remains.

A. Based on your description, my first guess would be mealybugs, which, if bad enough, do lose their individuality and look like the white goop you describe. Phalaenopsis are more susceptible to mealybugs than most orchids, because they grow faster and are, therefore, softer and tastier to sucking insects. Mealybugs particularly like the flower spikes, and are especially difficult to eradicate, as they will hide under the bracts covering the nodes. Your best bet if the infestation is as bad as you say is to spray the plant with a pesticide such as malathion at label strength. Do it now before buds begin to initiate, or the plants may suffer some floral deformation. It will take 2 or 3 treatments at 7- to 10-day intervals to curb the problem. Try to watch your plants more closely so that the infestation does not progress to this point, as it will be easier to treat and can be treated with a less-invasive pesticide, such as insecticidal soap or horticultural oil. ***Ned Nash,*** American Orchid Society

Mealybugs on Orchids

By Paul J. Johnson

Mealybugs are serious pests of orchids and are probably the most difficult to control pest of orchids in homes and greenhouses. Most definitely, they need to be dealt with immediately upon discovery. The damage done to plants by mealybugs is considerable, causing a loss of vigor and a weakening and loss of leaves, buds, and flowers through their feeding. In addition, mealybugs create copious amounts of honeydew which make plant parts sticky, attracts ants, and provides a substrate for sooty mold. Though some mealybugs vector plant viruses apparently no orchid viruses are known to be transmitted by these insects. Mealybugs are not particular about their host and probably all species of orchids are susceptible to mealybugs, especially when cultivated.

Identification

Nearly 300 species of mealybugs are known from Canada and the United States. Fortunately, only a few species are common or serious pests of orchids. Mealybugs are classified in the family Pseudococcidae, and are closely related to the scale insects. In fact, mealybugs are best thought of as a kind of soft scale that does not form the protective cover that most scales produce for protection.

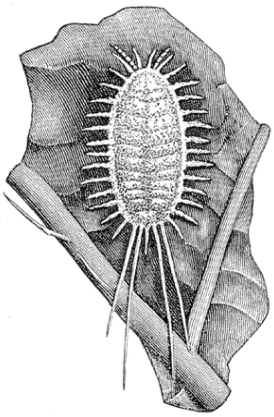
Immature to adult mealybugs may measure 0.5-8.0 mm in body length. All of the orchid feeding species are coated with a waxy secretion that hides the body of these insects. The more common species of these odd insects that infest orchids are immediately recognized in the adult stage by the white, yellowish-white, whitish-grey, or pale pink to pale blue in color coating. The body is oval and the sides of the body have short waxy filaments and there may be 2-4 short to long filaments on the posterior end of the body. These filaments sometimes give the impression of numerous legs.

Mealybugs can be found on all plant parts, but especially roots, rhizomes, pseudobulbs, and the underside of leaves. They are adept at hiding on roots and rhizomes deep in the potting media, in crevices and under sheaths, and in cracks and under lips of pots, trays, and benches. Unlike scales, mealybugs will often wander in search of feeding sites. The immatures are small, and white to yellowish or pale pink. Hatchling nymphs are not easily seen without a magnifier and hide under cover, but older nymphs appear like diminutive adults.

Orchids become infested with mealybugs in some combination of three methods: purchase of an infested plant, movement from infested to un-infested plants that are in contact with each other, and windblown colonization. Mealybugs are active and will crawl from one plant to another, pot to pot, and across benches. Mealybugs will leave plants and hide under rims of pots and trays, in bench crevices, and even drop from overhead plants. Spread of crawlers can occur both indoors and outdoors by floating on breezes or air currents produced by circulating and heater fans. The occurrence of infestation hotspots may be due to crawlers settling on plants where the air currents are the weakest. Similar effects are found with aphids, scales, and spider mites.

The identification of mealybugs is difficult and often requires the services of a taxonomic entomologist specializing on these insects. Because of this difficulty, accurate information on the identification and biology of species that may infest orchids is much poorer than one would hope. Undoubtedly, all the orchid infesting species were tropical in origin, but the most problematic species have adapted to indoor life and may feed on hundreds of species of ornamental plants other than orchids.

The U.S. Dept. of Agriculture lists 39 mealybug species from orchids. Fortunately, only a few species are problematic in Canada and the United States, but it is very easy for any of these species to be transported unseen. Consequently, extreme caution and due care is urged to anyone transporting orchids between states or countries.



In most of Canada and the United States, the longtailed mealybug (*Pseudococcus longispinus*) is probably the most common and problematic species on orchids, particularly in homes and greenhouses. This is also the most easily recognized species because of a pair of very long filaments on the posterior of the body.

Life Cycle

Mealybugs have a three-stage life history: egg, larva (nymph or crawler), and adult. Eggs are laid within a waxy coated egg sac produced by the female. The eggs hatch after about a 10 days into the mobile nymphs, the crawlers, that appear as diminutive adults. The crawlers are the most active stage that can move between plants and will develop through several growth periods before becoming adults. Adults of most species are also active. Thus, unlike scales where the crawler finds a suitable site for feeding and remains fixed, mealybugs will move about to find feeding sites. However, the most common pest species is the longtailed mealybug and it is parthenogenetic; no males of this species are known. Male mealybugs do little feeding

and only in their youngest crawler stages. Mature males are small (1.5-2.5 mm) winged creatures whose only function is to mate and die. Females and immatures do not fly, but they will crawl off of the plant and immatures can float in air currents. In temperate regions, mealybugs usually have only one or two generations per season. In a warm greenhouse or indoors there may be upwards of 8 overlapping generations per year. Out-of-doors in cold climates, cold-tolerant species of mealybugs hide in protected places, such as under tree bark, among roots, and in compost.

Management

Outdoor mealybugs are vulnerable to a variety of parasitic and predatory insects, including wasps, brown and green lacewings, and lady beetles. Weather, especially heavy rains, also help to keep mealybug populations low. Indoors, mealybug management is difficult because of their propensity to move into the potting medium and feed on roots, or for the crawlers to work their way into tight places. Repeated application of any treatment is required to kill the immatures, and treatments are at their greatest effectiveness against the small crawlers. Hand removal is effective only for the obvious adults and larger nymphs. All control efforts must begin immediately following discovery. Even light infestations restricted to one or a few plants can explode rapidly and necessitate chemical methods. When possible, immediately isolate infested plants from others to prevent the mealybugs from moving amongst them. Also, check the lips and cracks of pots, trays, and benches because females will wander and leave the plant to find hiding places.

Porter's Orchids Pest Control

- 1 part 409
- 1 part Simple Green
- 2 parts water

Shake and spray plant and bark thoroughly and often.

Because the life cycle of mealybugs can be so short combined with the overlapping of generations, you will need to do a treatment every 10-14 days in order to bring a serious problem under control. Because mealybugs are such a problem there are few effective "home remedies" available. To deal with an established infestation, the use of an insecticide will likely be necessary. Be aware that non-insecticidal treatments are often not very effective for elimination of mealybugs without diligent application and follow-up treatments.

Rubbing Alcohol

Probably the most popular home remedy against mealybugs is to swab and daub plants with a Q-tip or ball of cotton dipped in isopropyl (rubbing) alcohol. Do not use other alcohols, such as ethanol or methanol, that will penetrate the plant tissues and cause considerable damage! The common 70% isopropyl available in stores is satisfactory. On hard-leaved plants, gentle rubbing with the fingers, a cotton ball, or a soft infants toothbrush is effective. Remove all mealybugs, large and small. Afterwards, you will still need to repeat the alcohol treatment to remove the tiny yellowish spots which are the recently hatched crawlers. Pay particular attention to the folds, crotches, branch bases, midrib areas, and roots. Spraying the alcohol with a misting bottle or small pump sprayer is effective , but dribbling alcohol into tight areas is necessary.

Many home growers will also mix-in a small amount of mild liquid dish detergent, and sometimes mineral oil, neem oil, or horticultural oil. One recipe for a 1.5 liter spray bottle is to mix a 50:50 solution of isopropyl and water, with a few drops to about a teaspoon of liquid soap to act as a spreader, and a teaspoon of one of the oils. But, it seems that every grower has their own proportions of these ingredients, none of which seem to work significantly better than another. Caution is urged, however, as excessive amounts or too strong of a detergent, or use of an ammonia-based chemical cleaner may damage your plants, particularly buds and flowers. This is particularly true of dish-soaps and household detergents that could remove natural protective waxes from plant tissues. Also, spraying of alcohol is not always effective against eggs which are often well hidden, hence the need for thoroughness and repetition.

A potential problem with alcohol treatment that is occasionally reported may be chilling of the plant. The rapid evaporation of alcohol cools the plant tissues. Especially with air movement that increases evaporative cooling, this chilling is suspected of over-cooling tissues and creating zones of dead cells that can become necrotic with bacterial or fungal infestation. On warm days with a fan blowing consider wiping any residual alcohol with a tissue instead of permitting it to evaporate off the plant.

USDA Pest Control

- 1 cup alcohol
- ½ tsp liquid soap
- 1 tsp Tabasco
- 1 quart water

Repotting

Even a light to moderate infestation of mealybugs should be of concern. These insects like to move into the potting media and feed on roots, or move off of the plant to find hiding places to lay eggs. Unless the roots are checked and the media changed, removal of mealybugs from only the upper plant portions is not a guarantee of success. The potting medium can harbor eggs and crawlers, so dispose of it in a compost pile or in the garbage. When repotting, a close inspection, and if necessary a very gentle cleaning and spraying of the roots before repotting is essential.

Oils and Soaps

Horticultural oil, neem oil, mineral oil, and insecticidal soaps are effective for mealybug suppression. The oils and soaps are often regarded as "organic" or non-chemical methods, but this is a misconception or an extremely broad and nearly meaningless concept of "organic."

Indeed, neem oil is extracted from the neem tree, but horticultural oils and mineral oil are petroleum distillates. Likewise, insecticidal soaps are a solution of synthetic pyrethroids mixed with a mild detergent that is made from petroleum products. However, all of these solutions are generally considered safer for humans, pets, and plants than usual insecticides. None provide absolute control over mealybugs, but frequent use during the presence of crawlers can serve to reduce their populations dramatically.

Horticultural, mineral, or neem oil solutions smother the insects, so complete coverage of all sprayed plants is essential. These oils are mixed with water and usually a plant-safe detergent for enhancing the spreading and sticking of the oil. The main caution with these oil solutions is that they should never be applied to plants on hot days (>85deg.F) or in direct sunlight, as to prevent burning of tissues. Leave the plant in shade until the application has dried. Unpublished anecdotes suggest that the flowers of some orchids are sensitive to neem oil, such as species of *Miltonia* and *Masdevallia*.

Insecticidal soaps are usually solutions of a synthetic pyrethrin and a plant-safe detergent. As with oils the detergent acts as a surfactant and spreader for dispersing the pyrethrin evenly, and as a mild caustic against the insects. Also, to prevent sunburning apply the chemical and allow it to dry in shade. Pyrethrins are synthetic analogs of pyrethrum, the natural extract from certain Asteraceae. Caution should be urged with so-called "safe" insecticidal soaps as some plants are sensitive, particularly tender new tissues. Some non-orchid ornamentals will drop leaves and abort flowers when sprayed with insecticidal soaps, so caution is urged with prized orchids.

Insecticides

Persistent populations of mealybugs or infestation in many plants may demand the need for use of synthetic insecticides. There are several common, inexpensive, home-and-garden use pesticides labeled for ornamental plants. Insecticide formulations not labeled for ornamental plants are often mixed with solvents that aide in the application of the active ingredient for specific purposes. These solvents, not necessarily the insecticide itself, often produce phytotoxicity and may seriously damage or kill plants. Thus, never use any insecticide that is not specifically labeled for ornamental plants. Some of the more available and effective insecticides that come in various brand names are acephate (e.g., orthene), malathion, carbaryl, and diazinon. Pyrethrins and rotenone have limited effectiveness. Of course, always follow label directions and never exceed the minimum recommended concentration given in mixing directions! Recommended solutions are based on extensive testing for selected pests and plants. Orchids are tough plants, but are sensitive to many chemicals, particularly under direct sunlight or high heat, and while certain species may not react to a given formulation others may, so testing is justifiable.

Some insecticides are occasionally discontinued for use because of some discovered hazard. For example, Cygon used to be available, but it no longer recommended and labeled for orchids because it will damage many plants, especially the buds and flowers, and is extremely hazardous to use. Although most insecticides with discontinued labels are legally allowed to be "used up", it may be best to dispose of such chemicals rather than continue their use and risk damage or loss of plants, or increase your own health hazard.

Most home orchid growers in northern states that need to apply insecticides during inclement weather need to take special care for applications. If you cannot spray out of doors, place your plant(s) inside a large plastic bag (remove the bag after the spray has settled!) and let the plant ventilate where the fumes will not be wafted around the house or work area. Again, you may have to consider removing the potting medium, spraying the plant, and repotting it with new media in a clean pot when the spray has dried.

Growth Regulators and Chitin Inhibitors

These classes of insecticides have great potential for use in orchid pest management. Growth regulators are relatively expensive, but the cost per application is less than botanical oils.

Kinoprene (tradename = Enstar) is a synthetic form of juvenile hormone which is highly important in insects at critical stages of their metamorphosis. The use of kinoprene interrupts the normal development of the insects, including mealybugs, scales, aphids, and whiteflies. This insect hormone appears safe for humans and pets under usual use precautions. Reports of its use in greenhouses and home collections suggest that this may be the best new generation pesticide for controlling many orchid pests, including mealybugs.

Bifenthrin and other growth regulators are also available for use on ornamentals, but little information is available for orchids.

Azadirachtin (tradenames = Azatin and Neemazad) is a plant derived chemical that is a chitin inhibitor. Chitin is a primary compound used by insects when developing their integument, or exoskeleton. Azadirachtin reduces the insects' ability to properly develop its integument and causes mortality through incomplete development. There is little information available on this chemical for use on orchids, but it is available on a wide variety of ornamentals, is labeled for greenhouse applications, but may be too expensive for most home greenhouse uses.

Biological Control

There are many parasitic wasps and various predatory insects that feed on mealybugs outdoors, but these species are rarely of value in a greenhouse, or in the home. Usually for the small collection orchid keeper the use of biological control agents is not effective. However, the

keeper of many plants in a greenhouse or a grower may wish to consider the use of one or more parasitic or predatory insects to help keep mealybugs under control. As in all biological control efforts eradication is not possible. Also, anyone wishing to use biological control agents needs to balance their use with proper timing or avoid the use of insecticides so as not to kill the beneficial insects.

Final Considerations

Heavy infestations of mealybugs, especially on many plants may require severe control methods using insecticides. On the extreme side if you have a plant showing signs of decline from scale you may have to seriously consider destroying that plant, as the low likelihood of rejuvenating that plant may not justify the expense and effort of continued treatments. Too, destruction of a sick plant can be used to justify the purchase of a new and healthier plant!

If you are battling mealybugs for long periods of time (e.g., >9 months) and have been using the same insecticidal control method then you probably developed a resistant population. The best resolution to this is to change methods and chemicals occasionally; that is, do not use the same chemical mix more than 3-4 times sequentially. After isolating infested plants give them a thorough application of something different from what you have been using.

For example, if you used insecticide then switch to an oil, soap, or different insecticide. Resistance is not a problem with growth regulators, such as kinoprene.

Generally, never use an insecticide not labeled for ornamental plants. Whenever using oils, soaps, and insecticides, be thorough, change formulations frequently, and do not use less than the minimum concentration of mixture. Too little of a chemical enhances resistance, while too high of a concentration may damage the plant. Never use chemicals prophylactically, that is do not routinely use chemicals as a preventative as it is a waste of chemical (and money!) and such use allows resistant mealybugs to develop. Finally, keep up the manual removal of all mealybugs, if possible.

Mealybugs are an excellent example of pests that are easily transported and create tremendous problems. Although most orchid keepers in North America obtain their plants from conscientious growers in either Canada or the U.S., many persons do purchase plants while traveling or from questionable sources. Everyone needs to be aware of the great potential of inadvertently dispersing species to new areas, particularly from international originations. There cannot be enough stress placed on the recommendation that all plants come from a reputable and quality grower, and are clean of pests.

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