Orquídea

ORCHID PESTS

11. Ladybug (*Coccinella septempuntata*) feeding on an adult aphid.

By Ing. Gerardo Castiglione

Revista de la Sociedad Peruana de Orquideas; afiliada a la AOS Nr. 69992. Afiliada Internacional al NGC Nr. 527

Edition: Susi Spittler

December 20

INTRODUCTION

This article is the continuation of the one we published last August, and I bring you again some of the phrases that were included in it. Our orchids are living beings that, throughout their lives, establish relationships with other organisms, these relationships can be beneficial or harmful for them. Pests and plagues are animals that at certain stages of their life feed on our orchids and become a headache for growers because many of them are practically invisible to our eyes and the symptoms of their attack are usually difficult to detect and identify accurately.

The attack of many of the pests does not depend on the health of our plants, since these small animals are usually transported in their oval or larval states by the wind or by other animals to our crops, where they find a lot of quality food available. which is very attractive to them, forming large colonies in a very short time. Many of them are nocturnal, others are masters of disguise, and still others attack parts of our plants where an inexperienced eye might not be aware of their presence.

Our fight against pests must begin by rigorously implementing appropriate cultural practices that can help us identify their effects in time, such as:

Observe the plants carefully

If possible, every day. Approach them, look under the leaves, the pseudobulbs, the substrate. From time to time lift the pots and look at them underneath. If they are in flower, look well for any insects at their base, see them from behind. It can be difficult to identify damage at first, but over time, the trained eye will be the difference between a spot attack and the damage of the entire crop.

Keep the orchid clean and free of weeds,

why ?. Because insects can establish hidden reservoirs or colonies in plants that grow in the ground or on the tables.

Avoid overpopulation and overcrowding plants

why ?. Because when the plants are close together, their observation is difficult.

Remove the dried bracts

Although it seems something unimportant, in plants of sympodial growth (Cattleyas, Oncidium, etc.) try to remove the dry bracts of the pseudobulbs, leave them completely bare and clean. This prevents the scales from being able to hide under them.

Quarantine and sprinkle with a good insecticide / miticide newly acquired plants

why ?. The new plants must be protected with a good insecticide / miticide when arriving at the orchid garden and they must be kept for a time, at least 15 days, away from the others, because we do not know their growing conditions and they can be carriers of insects, mites or other animals that could quickly attack all of our plants.

December 20

Revista de la Sociedad Peruana de Orquideas; afiliada a la AOS Nr. 69992. Afiliada Internacional al NGC Nr. 527

Perform preventive insecticide applications

why ?. Even when the growing conditions are excellent, if you cannot visit your farm and observe your plants on a daily basis or if you do not have enough knowledge to identify pests or their effects, it is necessary to apply products that help us to preventive way to avoid their attack. There are several products designed for this purpose, and in my opinion, all have their pros and cons. Let's see:

Biological products:

These products base their action on the knowledge of the relationships between different organisms, and mainly contain spores of entomopathogenic fungi that recognize the cover of the pest insect penetrating inside, within which they release substances that digest and destroy it. If the environmental conditions are suitable, the fungus produces new spores on the outside of the dead insect. The best known are *Bauveria bassiana*, *Metarhyzuim anisopliae* and *Lecanicilium lecanii* among others:

Their strength lies in the fact that they are safe products that do not pose any danger to people or pets.

Their weakness is that they must be applied very frequently so that beneficial fungi are always present on the substrate and plants. Some suppliers recommend weekly applications, others even every 4 or 5 days.

When using biological products, agrochemicals should not be used, as these also attack beneficial fungi.

In most of our countries there are commercial houses that offer these products under different names. I recommend applying *Bauveria bassiana* every 15 days to the entire crop; it can be done together with the fertilizer.

Chemical products:

Agrochemicals, also known as pesticides, are molecules created by man that, when in contact with insects or mites, produce physiological imbalances that lead to their death.

There are products that act by contact and others with systemic action that enter the vascular tissue of the plant and exert their action effectively for some time.

Their strength lies in the fact that they are highly effective, some of them have been created specifically for certain types of insects, others have a wide spectrum of action. Against them it can be indicated that, to a greater or lesser extent, they are toxic to people and animals, as well as to the environment in general.

The indications and doses that appear on the label of each product must be strictly followed, since if it is applied in excess it can cause damage to the plants and if it is applied in insufficient quantity it will not produce the desired effect and will easily create resistance.

You must be very rigorous with the protocols for personal protection and equipment cleaning, in addition to controlling entry into the treated area and avoiding handling freshly sprayed plants.

It is not recommended to mix products to combat different pests in a single application, you should study the product labels to see if they are compatible or not.

It is not advisable to always apply the same product. Agrochemicals should be alternated, using active ingredients from different chemical groups, to avoid creating resistance in insects.

I know that some will criticize me for this, but I do not do preventive applications with chemical products, I only apply these products when I observe the appearance of an insect, mite or other animal. I recommend this because I am in contact with my plants on a daily basis and can identify a pest when it just appears.

A good surfactant should always be added to the agrochemical, insecticide or miticide. This fulfills two functions: it brings the mixture to an ideal pH of +/- 5.5 and when applied, it improves the distribution, permanence and absorption of the chemical in the treated plants.

The use of biological products or agrochemicals is at the discretion of the grower, according to his experience, the results he has obtained, his ability to follow the regulations and the correct procedure for their use and his responsibility towards the environment.

It is true that no plant is exempt from suffering an attack and for that reason it is very important that the grower learn to identify pests and recognize the symptoms of their attacks in order to quickly and effectively undertake controls and thus minimize their destructive action on plants. Next, we are going to describe and identify the most common pests that usually attack our orchids and describe the most effective methods for their control.

INSECTS

Insects are the pests that should concern us the most, many are the species that feed by biting tissues or sucking the sap of plants, causing significant damage to our plants. Many of them appear periodically encouraged by environmental factors, so we must be vigilant to identify and control them promptly.

BITING INSECTS

1. Cockroaches:

Cockroaches are insects with an oval and flattened body, whose head is usually protected by a shield-shaped pronotum with chewing jaws. Its legs are long, flattened and spiny. Some species are winged.
The common cockroach (*Blatta orientalis*), also known as the black or oriental cockroach, can grow to about four centimeters long. See photo No. 1

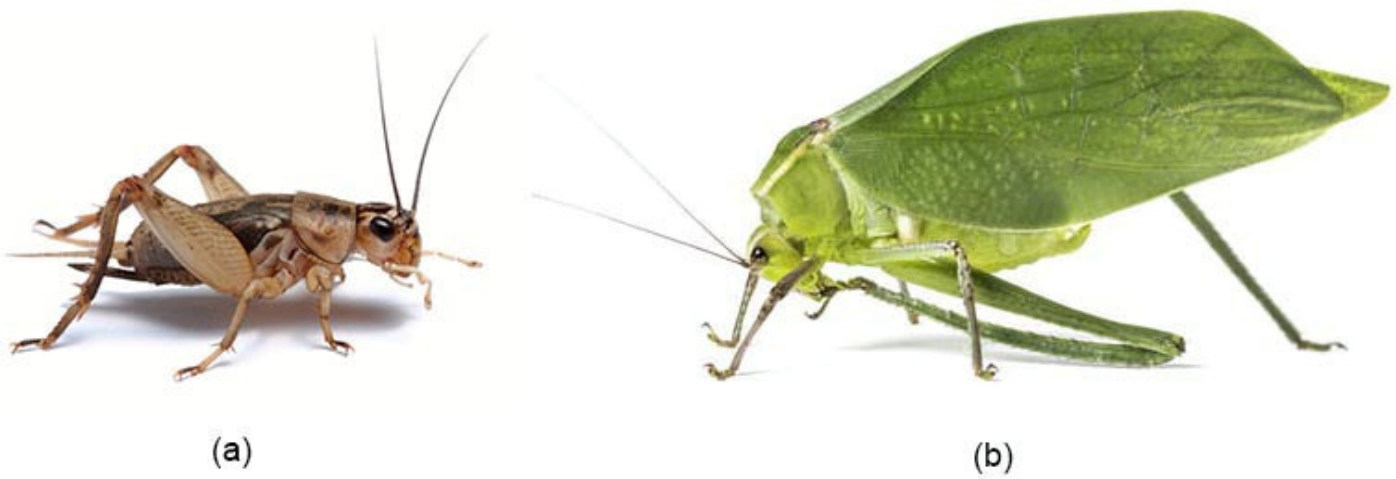
1. Common Cockroach (*Blatta orientalis*)

They are omnivorous insects that have an extraordinary ability to survive, they adapt and thrive in any environment, although they prefer humid environments, so the mats of our orchids are ideal for them. During the day they remain hidden and come out to feed at night, making it very difficult to see them on the plants. They usually feed on the tips of the roots and flowers.
It is impossible to eliminate them completely, we must learn to live with them. It is advisable to place some mint or spearmint plants between orchids because roaches hate their smell.

2. Crickets and Grasshoppers:

Crickets belong to the Ensifera sub-order of the *Orthoptera* Order, *Grylloidea* family. They are brown to black insects with nocturnal habits. Some species are practically domestic, for example Acheta domesticus and *Gryllus bimaculatus* in temperate zones and *Gryllodes supplicans* or *Gryllodes sigillatus* in tropical zones. Its legs are adapted for jumping and running. They usually dig burrows in the ground. They are omnivorous insects: they eat both plants and other insects.
Crickets are related to grasshoppers, which belong to the *Caelifera* sub-order of the *Orthoptera* order, also commonly known as lobsters. Their hind legs are typically long and strong, appropriate for jumping. They have two pairs of wings, only the rear ones are membranous and allow them to fly, while the front ones are leathery and not useful in flight. The females are larger than males. They are herbivorous insects with diurnal habits, some of which are serious pests for agriculture.

Both types of insects have very strong jaws and have a preference for juicy shoots and flower rods, which snap off easily. See photograph No. 2 ra.



2. a. Cricket (*Acheta domesticus*), b. Grasshopper (*Stilpnochlora couloniana*).

3. Caterpillars:

Caterpillars (eruciform, caterpillar-shaped larvae) are actually the larvae of insects of the order *Lepidoptera* (butterflies). Their bodies are soft and cylindrical, divided into segments.

They have three pairs of legs and five pairs of false legs called spurgeonies. They have two powerful spoon-shaped jaws with serrated edges. Some species are very colorful, others are hidden in the foliage. Many of them have thorns and stinging hairs that they use to defend themselves.

Caterpillars are known for their insatiable appetite, they are exclusively herbivorous and can become a serious pest to crops. In a very short time, a caterpillar can devour a shoot, a leaf or a flower of considerable size. See photographs No. 3 and 4.

3. Caterpillar feeding on a *Phalaenopsis* flower.

4. Attack of a Caterpillar on Phalaenopsis leaves.

It is very common to see them in inflorescences of *Epidendrum* type *elongatum* , where the larva takes the color of the flowers when feeding on them. In specific cases we can simply take the caterpillars with our fingers, as long as they are not of the species that have stinging hairs.

In extensive cultures they fight them by spraying with spores of bacteria such as *Bacilus thuringiensis* that attack the intestines of *Lepidoptera* (Butterflies). It can also be sprayed with spores of the entomopathogenic fungus *Beauveria bassiana*, which has proven to be very effective in controlling bare-bodied caterpillars with no hair on the body. These die between two and fourteen days after inoculation of the fungus.

Small parasitic wasps such as *Trichogramma sp*., which use the eggs of butterflies to lay their own eggs, can be used.

SUCKING AND RESPETOR INSECTS

1. Cottony Mealybug:

The cottony mealbugs are insects of the *Pseudococcidae* family, also called "scale" insects. They are cosmopolitan insects, in temperate climates they are a real pest for greenhouse crops, and in tropical climates they attack in open areas.

They present sexual dimorphism, the females maintain the characteristics of nymphs, without wings, but unlike the other "scale" insects, they have legs and can move, they are oval in shape and measure 2.5 to 4 mm in length and 2 to 3 mm wide. Females feed on the sap of plants and secrete a layer of powdery white wax that covers them, which is where their name comes from. Adult males are winged, look like small wasps, do not feed in their adult stage, and only live to fertilize females, which tend to live in groups in protected areas of plants such as the dry bracts of pseudobulbs. The duration of the life cycle is highly variable and depends on the temperature; lasts 90 days at 18 ° C and 30 days at 30 ° C.

The best known species are *Planococcus citrus* (Citrus mealybug), see Photo No. 5, and *Pseudococcus affinis* (Tomato mealybug).

The cottony mealybug is a real headache for many growers because it becomes very difficult to eradicate them, they are only controlled for some time and then they reappear.

As a biological control we can recommend the use of Ladybugs of the species Cryptolaemus monstrouzieri, (see Photo No. 6) their larvae are covered with a white wax, making them similar to mealybugs.

It is also known that some species of wasps such as *Anagyrus nigricornis*, *Anarhopus sydneyensis, Arhopoideus peregrinus* and *Lepidomastix dactylopii* often parasitize mealybugs. *Cryptolaemus monstrouzieri* and *Lepidomastix dactylopsii* are available in many commercial insectaries.

5. Citrus mealybug (*Planococcus citri*)

6. Ladybug (*Cryptolaemus montrouzieri*), feeding on a mealybug (*Planococcus citri*).

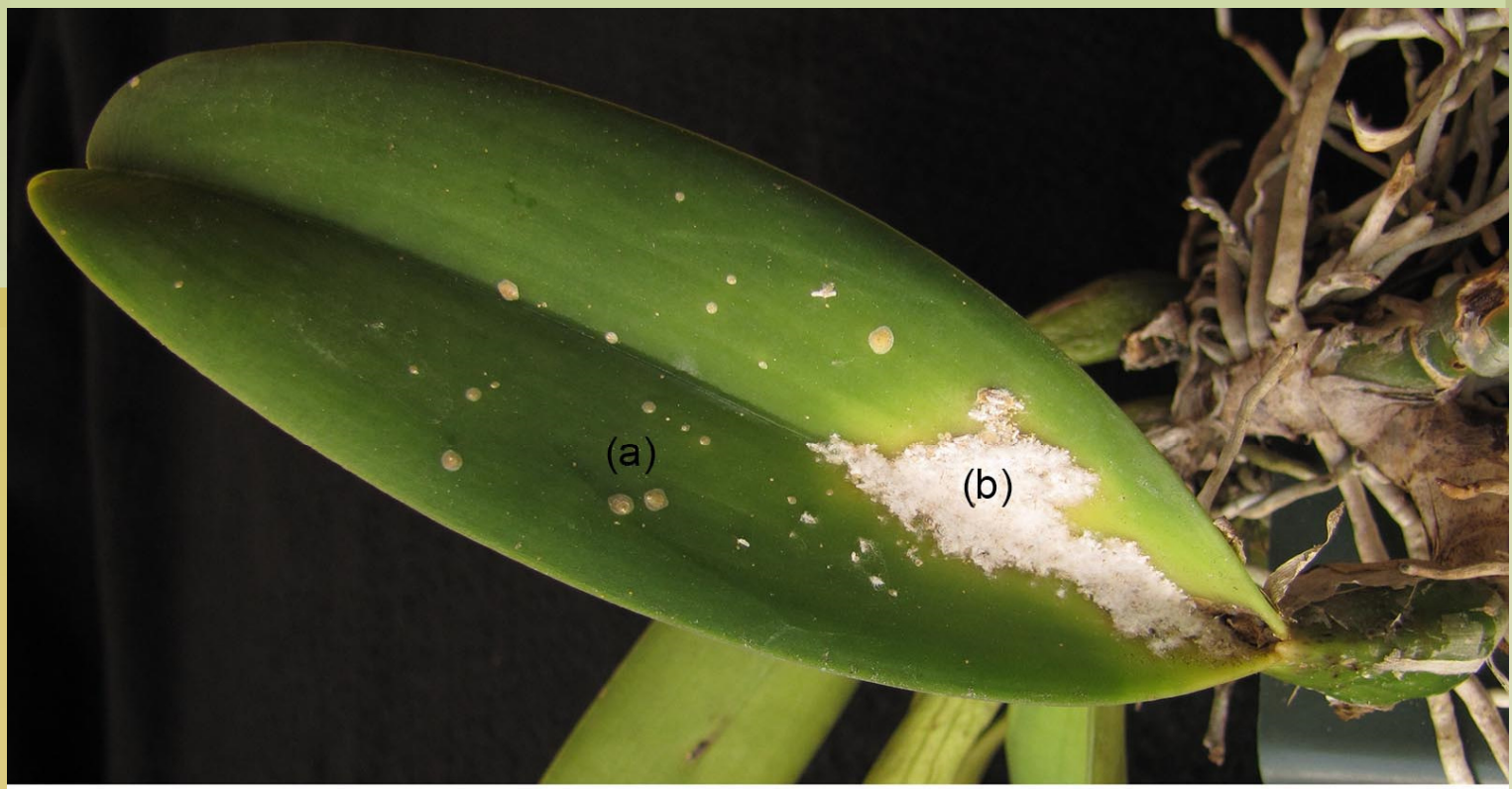
2. Scales:

Scale insects or simply scales (*Coccoidea*) are a superfamily of small insects of the order *Hemiptera*, commonly known as mealybugs. Some 8000 species are known, most of them parasitic, that feed by sucking the sap directly from the vascular system of host plants through a straw-shaped mouthpiece.

The scale insects that usually attack our orchids belong to the group of "armored or armed scales", so called because of the waxy covering in the form of a helmet or shield that covers their body, and that can vary between the different genera, from elongated, oyster-shaped or circular, with a size between 1 and 4 mm in diameter.

7. Colony of adult scale insects on a leaf of *Cattleya sp.*

Females are legless and sedentary, feeding throughout their development and living from a few weeks to several months, depending on the number of generations per year of each species. Male covers, as a rule, are more elongated and narrower than female covers. See Photographs No. 7, 8 and 9.



8. Scale insects on a Cattleya leaf. a. Adults, b. Nymphs.

9. Population of scale insects, adults and nymphs. Infesting a Cattleya pseudobulb.

The genera that most frequently attack our orchids are: Coccus, especially *Coccus hesperidum*, scales with a relatively soft cover; and *Saissetia*, particularly *Saissetia coffeae*, called hemispherical scale, it is common to see it infesting the flower rods of *Epidendrum* and *Encyclia.*

In their first stages of growth, the nymphs are carried by the wind to new host plants, upon arrival, they can move for twelve to twenty-four hours before they fixate and form their protective shield.

Outdoors the scales have between one and four generations per year, but in greenhouse environments, they can overlap generations with all growth stages developing simultaneously.

For the inexperienced eye it can be very difficult to identify them and they are often mistaken for parts of the plant, and not as true insects. They represent a pest that can spread quickly through our orchid garden if it is not attacked promptly and correctly.

3. Aphids

Aphids belong to the *Aphididae* family. with about 3500 species, of which about 250 species are pests for agricultural and forestry crops, as well as for gardening. Of all of them there are some that only affect a single crop (monophagas), and others that affect a large number of them (polyphages). They have a size that ranges between 1-10 mm.

Its body is soft with a rounded pear-shaped back where two dark-colored tubular structures called cornicles are observed. The color can vary from white to black, going through yellow, green and brown. Its most relevant anatomical characteristic is the possession of a stylet in its oral apparatus, a structure capable of passing through the epidermis of the plants until reaching the phloem, from which they suck the plant sap, causing discoloration, damaged and yellowish tissue. Aphids secrete a sticky, sugary residue known as honeydew. Honeydew attracts ants, which develop a symbiotic relationship with aphids, protecting them and transporting them from one plant to another. The growth of fungi (sooty mold or sooty mold) on plant surfaces is also favored. Furthermore, they are known to be effective transmitters of viruses, injecting them into the plant while feeding. The life span of an aphid is one month on average, in that time it can produce 40 to 80 young. Some aphids or aphids have wings, others do not.

The most important species of aphids found in greenhouse crops are: *Myzus persicae* (green peach aphid), *Aphis gossypii* (cotton aphid), *Macrosiphum euphorbiae* (tomato aphid), *Aphis fabae* (black bean aphid) and *Aphis craccivora* (bean aphid).

In our orchids we can see them feeding on the most tender parts such as new shoots and flower buds. See photograph No. 10.

10. Population of adult aphids.

When a specific infestation is observed, it can be controlled by "sweeping" the aphids with a brush soaked in ethyl alcohol, blue soap or vegetable oil. These products create a barrier on its skin that drowns them out.

If we talk about biological control, we can mention the inclusion to the culture of parasitoid wasps of the genus *Aphidius*, such as *Aphidius colemani* and *Aphidius matricariae*. *Neuroptera* insects such as *Chrysoperla carnae* and *Chrysopa formosa* are also effective, in addition to the well-known ladybugs such as *Coccinella septempuntata*. See photograph No. 11.

December 20

11. Ladybug (*Coccinella septempuntata*) feeding on an adult aphid.

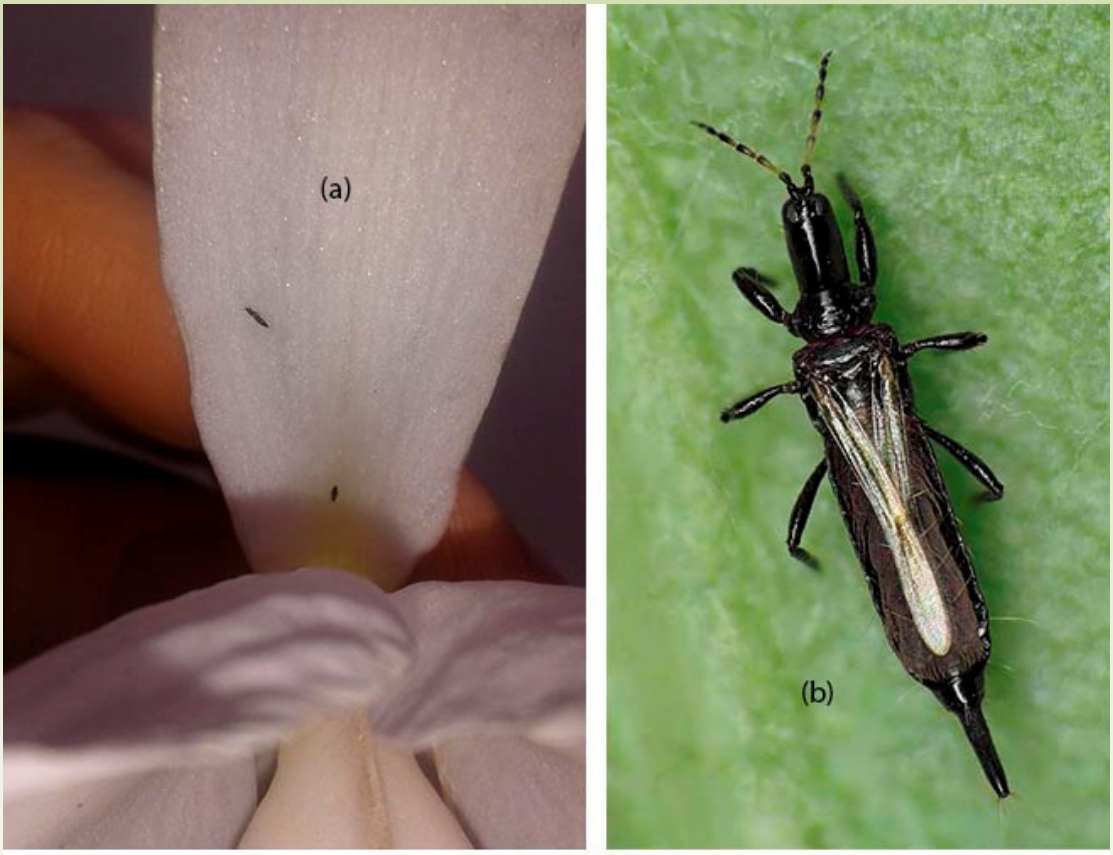
Periodic sprays with the pathogenic fungus *Verticillium lecanii* can also be done.

4. Thrips:

Thrips are small insects belonging to the order *Thysanoptera (Thysanoptera)*. Some 5,600 species are known, many of which are pests of cultivated plants and virus vectors.

They are small insects, 1 to 4 mm, cylindrical, elongated and with a very sharp rear end. They can be yellow, brown, or black with alternating light and dark bands. They have an asymmetric mouthpart, with which they scratch and lacerate the surface of the vegetable and then suck the spilled juices with the mouth cone, sucking through the alimentary canal.

The genera of thrips that cause the most economic damage to crops are *Frankliniella*, *Scirtothrips Taeniothrips* and *Thrips. Frankliniella occidentalis, Frankliniella panamensis, Frankliniella auripes, Frankliniella colombiana, Frankliniella minuta, Thrips tabaci* and *Taeniothrips simplex* are the best known for being polyphagous species that attack a large number of plants, including our orchids, attracted to flowers by their bright colors (including white, blue and especially yellow), where they land and proceed to feed, with the tendency to seek pollen as a food source to obtain the greatest amount of proteins, carbohydrates, sterols and vitamins and thus increase their reproductive capacity. When attacked, the flowers initially show the typical white edges, spreading to the entire flower when the infestation is severe. See photographs No. 12 and 13.



12. a. Thrips *(Frankliniella occidentalis)* on a flower of *Cattleya sp.*
b. Detail of *Frankliniella occidentalis.*

13. Damages caused by Thrips on *Cattleya lueddemanniana* flowers.

Thrips can reproduce sexually or asexually. Each female can lay between 30 and 300 eggs during her life, this depends on the quantity and quality of the plants that are her food. The life cycle of *Frankliniella occidentalis* includes: egg, nymph I, nymph II, prepupa, pupa and adult. Adults do not have a great capacity for their own flight, many individuals jump or fly with their fringed wings aided by air mass movements to reach nearby plants and advance in zonal colonization within the crop.

As a biological control we can recommend the introduction to the culture of *Amblyseius cucumeris* and *Iphiseius degenerans*, predatory mites of immature thrips. It has also been shown that spraying directly on thrips with *Beauveria bassiana* has controlled populations in greenhouses where ambient humidity is kept above 35%.

Thrips are a very resistant pest to chemical insecticides. It is important to know the habits and behavior of the species for its management. The eggs are laid by the female by inserting them into plant tissue and between the folds of leaves, bracts, flower buds, flowers, or other tender structures. Once they enter the prepupal stage, they leave their hiding place to settle in the ground, where the pupae remain protected by thin layers of soil or particles of plant material. In this way, it can be understood that, due to their location in the soil, prepupae-pupae have an important degree of protection against the impact of an insecticide application. Once the adults emerge, they reach the upper stratum of the plants where copulation and oviposition take place.

When chemical insecticides are applied, it is necessary to make at least three applications in a row with an interval of 7 days, and in cases of high temperature conditions and factors favorable to the pest, it is necessary to lower the interval to 5 days to cut its life cycle .

The vast majority of insecticides exert control by contact and ingestion. Products with systemic activity have advantages for the control of aphids and other insects since these species when feeding reach the vascular bundles where there is a high concentration of systemic products. Thrips have a scraping-sucking oral apparatus and feed on the mesophyll and epidermal tissues in such a way that they do not reach the vascular bundles.

To control thrips, I recommend using chemical insecticides from the neonicotinoid group, in addition to the broad spectrum insecticides indicated for all the other insects that will be shown later; the chemical component is indicated and the commercial name in Venezuela is indicated in parentheses: Imidacloprid (Admire), Thiamethoxam (Engeo) and Methomilo (Lannate). Three applications should be made 7 days apart and in rotation to prevent insects from developing resistance. It is suggested to use a repellent like CapsiAlil to force the thrips out of their protected places and thus increase the efficiency of chemical applications. It can be used in a mixture or separately.

5. *Cattleya* flye

The Cattleya fly, *Eurytoma orchidearum*, is actually a small parasitic wasp of the order Hymenoptera, family *Eurytomidae*. Like other wasps, the *Eurytoma orchidearum* has 4 wings, while flies only have 2. Its life cycle goes through 4 stages: egg, larva, pupa and adult, with a duration that varies from a few weeks to 4 months according to Ikeda, 1952 and Tanada, 1953.

Wasps mate within hours of emerging from the host plant. The female then pierces the plant tissue with her ovipositor and lays the eggs, making a separate puncture for each egg. The eggs are generally laid on the young shoot or in the yolk at the base of the plant. Sometimes the eggs are deposited on the rhizome, pseudobulbs, or, very rarely, on the leaf blade. A female can lay 50 eggs during her 5 days of life (Ikeda, 1952).

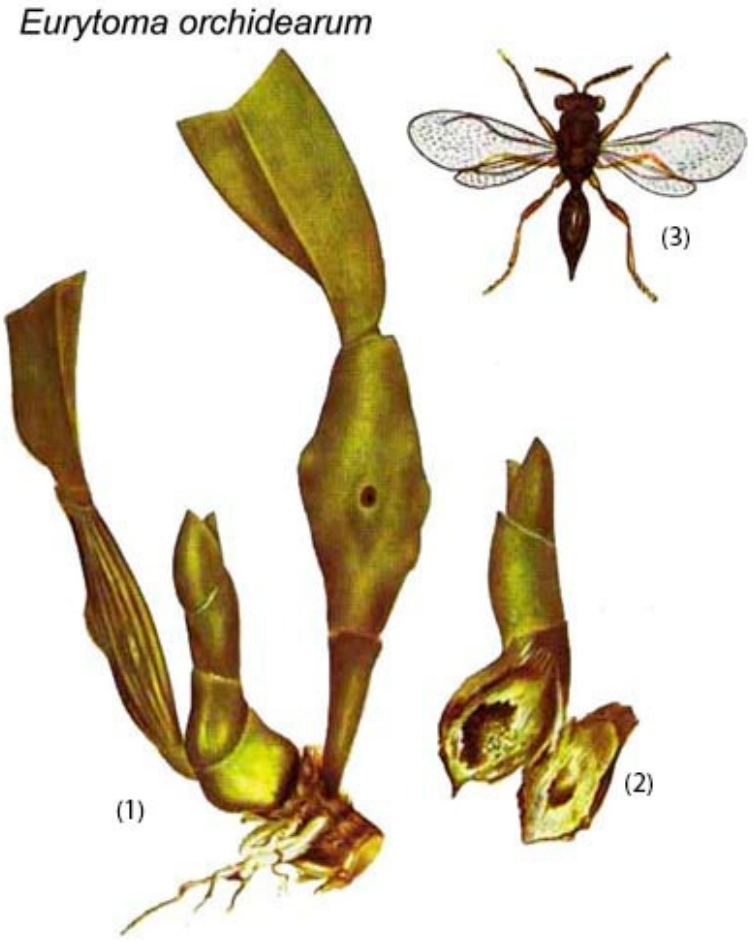
The orchids affected by this pest are *Cattleya* and its related genera such as *Laelia, Brassavola*, etc.

Once hatched, the larvae feed on the surrounding plant tissue. This creates a cavity where the larva lives. The larvae feed as they grow, enlarging the cavity. Often times, the cavities of several larvae will join together to form a single larger cavity containing many larvae. After pupation, many adults often emerge from the same hole. The affected suckers are stunted, do not develop normally and deteriorate the general condition of the plant.

The eggs are creamy white. They are very tiny, around 0.8mm. and are located within the plant tissue. The prick the female makes while laying eggs is also tiny and barely visible. The egg period varies from 10 to 20 days, depending on the temperature.

The larvae have a creamy white legless body, about 4 mm long. The larval stage requires about 70 to 100 days for development. The pupae are initially white, changing to a glossy black 15-20 days after forming, and the adult emerges 6-18 days after the color change. The total period from the deposit of the eggs to the emergence of the adults varies from 100 to 158 days. Adults are black with two pairs of transparent wings. The legs are lighter in color than the body. The back of the body, the abdomen, is shiny, while the rest of the body and head are dull. Females are approximately 5 mm long and males approximately 3 mm. Adult females begin to lay their eggs just a few hours after emerging, and they do so over a period of about five days. The half-life of adults is 7 to 15 days, during which they do not feed. See photographs No. 14 and 15.

14. Cattleya fly *(Eurytoma orchidearum)*



(1) and (2): Pseudobulb and new growth attacked by *Eurytoma orchidearum*.
(3) *Eurytoma orchidearum*, adult form.

15

Cattleya fly

Wasps are so small that they can be easily overlooked. They are similar in size to beneficial parasitic wasps. Adults are active during daylight hours, they are not good fliers, they seem to jump from one place to another (Tanada, 1953).

The way of life of this insect makes its control difficult. As a general rule, infested suckers can be easily detected, and their removal is an important factor in a successful control program. This method has been the only one in the past. Currently, systemic action insecticides can be applied periodically to achieve control of the pest.

6. Root wasp:

The so-called root wasp, *Calorileya nigra*, like *Eurytoma orchidearum*, belongs to the order *Hymenoptera,* family *Eurytomidae*.

This small wasp lays one or two eggs on the outer wall of the root apex of various kinds of orchids; the larvae feed on the root tissue and form a gallery that causes a "gall" or noticeable thickening in the shape of a ball that affects their growth cycle. The larvae are whitish, bent, and are about 2 mm long when fully developed. Adult insects are black with brown eyes and yellow legs, and are approximately 3 mm in size; being the males a little smaller than the females. The life cycle lasts from 50 to 60 days from egg to adult, which leaves a small hole in the formed gall when hatching. See photograph No. 16.

16. Root galls formed by the attack of the root wasp (Calorileya nigra). In the inset, adult wasp.

Although the root becomes ugly and deformed, after some time the attacked roots continue their normal development, following their growth from the galls. It should be remembered that at no time does this problem stop the absorption of nutrients through the affected roots and that it only temporarily stops their growth.

From the moment the first galls appear, the control of *Calorileya nigra* can be done by removing and eliminating the affected parts, in parallel with the application of systemic insecticides with at least 30 days of difference between applications.

7. Bicolor bug:

The *Tenthecoris bicolor*, also called bicolor bug or orchid bug, is an insect belonging to the Miridae family of the order Hemiptera. It is the most common, among other species that have the same habits, such as *Neofurius carvalhoi* and *Neoneelia zikan*. They have a biting-absorbing mouthpart that they use to suck the sap of plants, becoming effective transmitters of viruses.

The eggs are kidney-shaped, with an axis greater than 0.68 mm and less than 0.31 mm; translucent yellow in color, as hatching approaches, they turn reddish due to embryonic coloration. Then it goes through five nymphal states that are characterized by being translucent white, with reddish brown spots. The adults measure between 3 and 4 mm, the females being somewhat larger than the males, presenting brown to black in the upper part, while the rest of the body is reddish-orange in the males and reddish in the females. The average development time to adulthood is 20 days at an average temperature of 24 ° C. See photograph No. 17.

.

17. *Tenthecoris bicolor*

As a consequence of the feeding of the insect, the attacked areas present small chlorotic macules both on the upper side and on the underside of the leaves. See photograph No. 18.

18. Chlorotic macules caused by the attack of *Tenthecoris bicolor* on Cattleya leaf.

In my orchid garden I have observed, on two or three occasions, small populations of five to ten individuals on a single plant. Biological control can be done with insecticides or long-acting natural repellants like Neem oil. Likewise, periodic sprays can be made to the culture with conidia of the entomopathogenic fungus *Beauveria bassiana*. Preliminary studies have also been carried out with a parasitoid microhymenopteran insect of the embryonic stage of the bug, which was identified as *Anagrus yawi.*

For the control of all the previously mentioned insects, the use of products that act by contact and ingestion, or products of systemic action, is at the discretion of the grower.

The effectiveness of one or the other depends largely on the method of application. If the sprinkling is done with good pressure and with a nozzle that adequately disperses the product, taking care to thoroughly wet the floor, countertops, pots, substrate and plants in all its parts, the products will be effective.

I recommend the application of contact and ingestion insecticides with a broad spectrum, the chemical component is indicated and the commercial name in Venezuela is indicated in parentheses, such as Lamdacyhalothrin (Lambada 50 EC, Landex 50 EC, Galtak 5 EC), Cypermethrin (Cima 20 and Lufenuron (Fenur 5 EC) and / or broad spectrum systemic action products: Dimethoate (Diphos, Sistemin, Sistoate) and Chlorpyrifos (Lorban 4E, Memphis, Dorsan). Whatever the product used, three applications should be made with separation of 15 days between one and the other of the same product, then rotation is done with another product to prevent insects from developing resistance.

I do not do preventive spraying, I observe my plants every day and therefore, I can identify the insects or the symptoms of their attacks when they are just beginning, which allows me to act quickly in their control.

.

MITE

Mites belong to the *Arachnida* class, which includes scorpions, spiders, and many other eight-legged arthropods. One of the defining characteristics of the arachnid class is chelicerae mouthparts, which are basically forceps-like feeding organs. Most plant-eating mites have needle -like chelicerae. Mites are further divided into the *Acari* subclass, which differ from other arachnids by the lack of body segmentation. The mites that damage plant material on perennial herbaceous plants, bamboo, and ornamental grasses are generally divided into one of three families: *Acaridae* (proper mites), *Tetranychidae* (spider mites), and *Tarsonemidae* (tarsonemid mites). Mites can be distinguished from insects by several external characteristics. Unlike insects, mites do not have antennae, wings, segmented bodies, or compound eyes. Our orchids are usually attacked by spider mites of the *Tetranychidae family,* specifically by the so -called red spider, *Tetranychus urticae*.

1. Red spiders:

The red spider (*Tetranychus urticae*) is a mite that belongs to the *Tetranychidae* family. The mites of this family are capable of weaving webs, which is why they are often confused with spiders. They are very small, they can be seen with the naked eye as small reddish dots on the underside of the leaves; adults are about 0.5 mm. See photograph No. 19.

19. Red spiders colony *(Tetranychus urticae)*

The spider mite is one of the most important arthropod pests of food and ornamental crops. It not only feeds on the foliage and flowers of the crop, but it also feeds on nearby weeds such as chickweed, wild mustard and oxalis. The mite pierces the epidermis of the host plant with its stiletto-shaped mouthparts, sucking out chloroplasts and leaving a chlorotic spot at each feeding site. The feeding of a population of mites generally causes a stippled effect on the foliage, see photo No. 20.

20. Chlorotic stippling on Phalaenopsis leaves, caused by the attack of spider mites.

The fabrics of the mites, in intense infestations, can cover the foliage and the flowers, these silk threads serve as a refuge against predators and acaricides, in addition to serving to maintain stable humidity.

21. Severe spider mite infestation on *Rhynchostylis* leaf. Note the large number of silk threads

They prefer young shoots and leaves rich in nitrogen. The optimum temperature for its development is 30 ° to 32 ° C. At this temperature, a complete life cycle (from egg to adult) can be completed in eight to twelve days. The average lifespan of adult females is approximately thirty days, during which they lay between ninety and two hundred eggs. The eggs are transparent and turn yellowish before hatching. The larvae have six legs and are pale green to light yellow in color. They become eight-legged nymphs, then protonymphs and deutonymphs, which are pale green to brown in color, and finally pass to the adult stage with a coloration close to deep red.

In nature, spider mite colonies are controlled by predatory mites of the Phytoseiidae family, such as *Phytoseiulus persimilis*, which feed mainly on immature mites and their eggs.

A small mosquito named *Feltiella acarisuga* is an excellent predator of the spider mite.

For spider mite control I recommend the application of broad spectrum chemical acaricides such as Abamectin (Vertimec, Abac) and Amitraz (Amitraz). Whichever product is used, two applications should be made 15 days apart of the same product, and in the next treatment, rotation is done with another product to prevent the mites from developing resistance. I do not do preventive sprays. The effectiveness of the products depends on the quality of the spray, you must have good water pressure and a nozzle to properly disperse the product, taking care to thoroughly wet the plants in all their parts, especially the underside of the leaves.

MOLLUSKS

Mollusks (“*Mollusca*” from the Latin mollis "soft") are non-segmented invertebrates, soft-bodied, naked or protected by a shell. Mollusks are the most numerous invertebrates after arthropods (insects, arachnids and crustaceans), and include such well-known forms as clams, oysters, squid, octopus, slugs and the great diversity of snails, both marine and terrestrial.

It is estimated that there may be about 100,000 living species. They represent a great evolutionary success, they are present in most habitats: aquatic and terrestrial, from the great altitudes of more than 3000 m to ocean depths of more than 5000 m deep.

They are soft-bodied animals, which we can divide into three regions: cephalic or head, a visceral mass and a muscular foot. They have a feeding organ called the radula, made up of rows of curved chitinous teeth. Many species have a calcareous shell that protects the visceral mass.

Mollusks are an important source of food for humans; but also, many species are means of transmission of numerous human and animal parasitic diseases, and others represent serious pests for crops.

Slugs and Snails are mollusks, which we can locate phylogenetically as follows:

Fila *Mollusca*, already described above.

Class: *Gastropods or Gastropods*. They present a cephalic area (head), a ventral muscular foot and a dorsal shell (which can be reduced or even lost in the more evolved gastropods); Furthermore, when they are larvae, they suffer the phenomenon of torsion, which is the turning of the visceral mass on the foot and head. This allows them to hide their heads in the shell, giving them a distinct evolutionary advantage.

Sub Class: *Pulmonata*. The *pulmonata* are gastropod mollusks that have developed lungs, allowing them to live on land. When they conquered the land, they lost their gills, gaining the lungs that allow them to breathe air.

Order: *Stylommatophora*. are the pulmonary gastropods that includes land snails and slugs.

Snails have a hard shell that serves as protection. Its size is highly variable, the smallest being 1 mm and the largest, the giant African snail, which can measure up to 30 cm. They secrete a slime or mucus that allows them to keep their body moist and helps them move. They feed using the radula, the equivalent of a tongue, in which there is a row of small teeth with which they scrape the vegetables they eat. On the head they have two eyes at the end of a pair of retractable tentacles. They also have a pair of sensory tentacles. They are hermaphrodites, but they need other individuals for fertilization. When conditions are not favorable, or in the hours of maximum sunlight, they usually take refuge under stones or in cavities in the ground.

In cold weather, the snails remain lethargic, staying inside the shell and sealing its opening. They lay their eggs on the leaves of the plants or buried, these hatch approximately 7-14 days after incubation. It usually takes several months for these newborn snails to become adults, at which point they are fertile and can lay eggs, a few thousand within a month. Depending on the environmental conditions, an adult individual can live from 5 to 25 years.

Slugs lack shells and, like snails, secrete slime that protects them from desiccation and allows them to move. On the head they have four retractable tentacles, on the upper ones are the eyes. They are cylindrical in shape and can measure up to 10 cm. During dry seasons, they burrow into the ground where they remain inactive and are known to hibernate, several individuals grouping together and burying themselves in the ground or under stones. Like the snail, they are hermaphrodites, being able to lay between 20 and 100 eggs stuck together with a mucous secretion. The eggs are deposited on the surface of the soil if the humidity conditions are favorable or they can also bury them, placing them under decomposing matter or stones. Eggs can remain dormant for up to 6 months in a dry environment. Once they hatch, the slugs reach their adult stage after about 2 to 5 months.

Slugs are usually carriers of a nematode (*Angiostrongylus costaricencis*) that causes serious pathologies in humans. Because of this, touching the slugs is not recommended.

Snails and slugs have nocturnal habits, which makes them difficult to detect. To make sure the damage to your plants is done by these pests, look for the shiny slime trails they leave behind. They attack roots, new shoots, succulent leaves such as *Phalaenopsis,* and flowers, leaving holes in their path. See photographs No. 21, 22 and 23.

22. Slug and Snail

23. Slug feeding on the leaves of an Aeridiinae.

24. Damage to a hybrid Cattleya flower caused by snails or slugs.

To control mollusks I recommend the following:

- Eliminate the hiding places they use during the day: old flower pots, rubbish or boards, etc.
- Plant snail-proof plants like geraniums, begonias, lantanas, nasturtiums, and many heavily scented leafy plants like sage, rosemary, and lavender.
- Barriers can be made with copper sheets, mollusks do not tolerate contact with copper, they are very effective but expensive.
- Barriers can be built with rice husks, mollusks do not like their feet to be covered by those small husks, it prevents them from moving.
- Lettuce leaves can be placed between the pots of our orchids at around 7 pm and then spend harvesting snails and / or slugs at 11 pm.
- Some growers recommend baiting with beer, I tried once but did not see good results.
- My orchid garden is full of little song frogs, *Eleutherodactylus cystignathoides.* Since I have these scandalous animals I have not seen a slug or snail or their damage to my orchids.
- Commercial metaldehyde baits such as Babotox, Baboxa, Matacaracoles, Alimet, etc. can be used. Some granites are placed in each pot on the substrate. They are poisonous to humans, pets, and birds. Metaldehyde quickly loses its effectiveness in sunlight and after rain or irrigation, so it must be applied with some frequency.

RODENTS

Rodents are small mammals, with approximately 2,280 species; It is the largest order of mammals, they are the most adaptable and the most prolific in the world. They reproduce well, grow fast, learn fast, and can be found in large numbers on all continents except Antarctica. The most common rodents are mice, rats, squirrels, porcupines, beavers, hamsters, gerbils, and guinea pigs. They have sharp incisors that they use to gnaw through the hardened endocarp of some seeds, wood, cut food, or as a defense against predators. Many eat seeds or plants, although some have more varied diets. Some species have historically been considered pests, eating crops, stored seeds, or spreading disease.

Rats and mice are the rodents that frequently attack our orchids.

Rats belong to the genus Rattus. They are medium-sized rodents, between 15 and 30 cm from the snout to the tip of the tail. The genus is home to about 60 species. Two of them, the brown rat (Rattus norvegicus) and the black rat (Rattus rattus) are the species with the largest worldwide distribution of markedly periurban ecology, they are almost cosmopolitan, lacking only at the poles; they have spread throughout the Earth along with the human being.

To control rodents we can assert a good variety of traps and bait rodenticides that are readily available in the warehouses, grocery stores and specialty shops.

Mice, for their part, belong to the genus *Mus*. They are small mammals, around 10 cm. The most common and known is the house mouse (*Mus musculus*), the second most widespread mammal on the planet after humans. Although several species of mice inhabit the domestic environment, both as commensals of humans, as pets and laboratory animals, others are of rural habitat.

In our orchid gardens, these small mammals tend to chew the roots and new shoots. In *Cattleyas*, when the attack is severe, they practically kill the plants by leaving them without growth buds.

25. Brown rat (*Rattus norvegicus*).

26. House mouse *(Mus musculus)*

27. Damage to rhizome and growth buds on *Cattleya sp.* caused by rodent attack.

Bibliography

Harry C. Burnett. Enfermedades de las Orquídeas. Ediciones Corpoven. s/f.

Stanton Gill, David Clement & Ethel Dutky. Pests & Diseases of Herbaceous Perennials. The Biological Approach. Ball Publishing. 199

Preparado por Gerardo A. Castiglione Gómez. Sociedad Merideña de Orquideología., Mérida. Venezuela

APPRECIATION

We thank

Ing. Gerardo Castiglione

For sharing with us his studies on

ORCHID PESTS

About Orquídea, the newsletter of the Peruvian Orchid Society.

We hope you have enjoyed reading Orquídea, now in its 90th edition. Our goal is to keep our friends around the world informed about the enormous diversity of orchids, their cultivation and reproduction, and the activities of our society.

Info@clubperuanodeorquideas.com orquideas.peru10@gmail.com

December 20