

ORQUIDEA

ORCHID CONSERVATION AT INKATERRA MACHU PICCHU PUEBLO HOTEL

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Machu Picchu Historical Sanctuary (MPHS) houses a vast variety of orchid species. The research in orchids that INKA TERRA ASSOCIATION has been conducting over the last seven years has extended the list of species in MPHS to a report including 110 new records: 7 species new to science, namely *Epidendrum pachacutecianum* Hágsater & Collantes, *Epidendrum quispei* Hágsater & Collantes, *Kefersteinia koechlinorum* Christenson, *Masdevallia marizae* Luer & Rolando, *Stanhopea marizaiana* Jenny, *Brachionidium carmeniae* Luer, and *Brachionidium inkaterresense* Luer & C. Soto; besides one name new to science, *Maxillaria deniseae* Collantes & Christenson, as well as one genus and species new to Peru, *Vasquezziella boliviana* Dodson. The register thus adds to around 350 species of orchids for MPHS, which can be supported through herbariums. The Sanctuary owes its great diversity to the height gradient that enables the existence of different ecological floors ranging from 1725 m.a.s.l. in the inter-Andean valleys to almost 6000 m.a.s.l. in the glaciers and snowy peaks.



Kefersteinia koechlinorum Christenson
Foto: Dr. Isaías Rolando

ORQUIDEA

Machu Picchu Pueblo Hotel, under the management of José Koechlin von Stein, features native forests housing over 300 species of native orchids. These green areas, with such a considerable number of species, have given rise to several species which are new to science.

The abovementioned conditions have attracted the attention of the American Orchid Society (AOS), whose editorial team considers the green areas of Machu Picchu Pueblo Hotel as the greatest *in-situ* conservation center for orchids and is evaluating its future use as a germoplasma bank to repopulate areas with orchids.

Such contributions to science encourage INKA TERRA ASSOCIATION management to learn more about the great diversity of orchids so as to publish the resulting findings at a national and international level.

Furthermore, the publication of information about other species in specialized magazines and books is underway.

This fascinating family of orchidaceous plants has significantly diminished in number during the last decade, and many are now in a vulnerable state. In the dry season, forest fires are a constant threat year after year; for example, one of the most damaging fires occurred on August 30th 1997, devastating large areas of primary forest containing native flora and fauna.



Masdevallia marizae Luer & Rolando
Dr. Isaías Rolando

ORQUIDEA

Secondly, *anthropic* factors such as indiscriminate logging for timber and related inappropriate practices have caused many tree species serving as hosts to orchids to disappear, as is the case of *Nectandra furcata* "yanay argoz", the fruit of which is one of the favorite foods of a bird called Andean Cock-of-the-rock (*Rupicola peruviana*).

Thirdly, cattle farming activities performed within the MPHS area have seriously impacted the terrestrial orchid populations, as these species end up serving as pastures for cattle, which trample on the terrestrial substrate causing compacting and erosion that affect the growth of plants, seedlings and the germination of seeds. Finally, furtive gathering of orchids by irresponsible amateur collectors seriously affects the diversity at MPHS, and many of these species die under bad cultivation conditions, unknown to science and without having been presented to the world, which remains ignorant of what MPHS is losing.



Forest Fire at WaqayHuillca mountain, 2009
Photo: San Marcos National University Biologist Roxana Casteñada

Inkaterra Machu Picchu Pueblo Hotel is located in a cloud forest, which is an ideal habitat for the growth of a great diversity of orchids, bromeliads, ferns, lichens, mosses, bushes and trees, as well as a great variety of fauna.

There are two marked seasons, namely the dry season from May to October and the rainy season from November to March, the latter being the best to observe greater flowering.

ORQUIDEA

THE ORCHID TRAIL OF INKATERRA MACHU PICCHU PUEBLO HOTEL

This project has been underway since 1987, conducted by the initiative of Mr. José Koechlin, owner of Inkaterra Machu Picchu Pueblo Hotel; orchid lover Dr. Isaiás Rolando; biologist and Inkaterra Association Manager José Purisaca; and Mr. Moisés Quispe Guzmán, our outstanding gardener who looks after the orchids at the Hotel and who performed the arduous task of preparing the "Orchid Trail", supported by local and foreign scientific researchers Benjamín Collantes, Carlyle Luer, Günter Gerlach, Henry Oakeley, Eric Hágsater, Rudolf Jenny and Ricardo Fernandez.



From the very beginning, the green areas at Inkaterra Machu Picchu Pueblo Hotel already featured a considerable diversity of native orchid species.

In order to foster the conservation of orchids, a major strategy was to rescue plants that were about to be lost, many of which were destined to die due to natural causes, especially those that fall off the branches of old trees, a very common occurrence both in the rainy season and in the dry season. Another important group of lithophyte orchids detach from the rocky surfaces of the mountains, particularly in the dry season.

The main goal of the *in-situ* orchidarium is to implement appropriate practices to manage such fascinating species so as to encourage their conservation, their biological research, and the potential creation of a germoplasma bank for the vegetative propagation thus ensuring the long-term survival of diversity in this habitat.

ORQUIDEA

We are currently carrying out crossed pollination of endemic species or species that are in a vulnerable state, as well as of species with low populations (as is the case of *Ada aff. euodes*, *Anguloa virginalis*, *Lycaste macrophylla*, *Phragmipedium caudatum*, *Vasqueziella boliviana*, etc.) in order to obtain seeds and plants for future reforestation and repopulation programs in impacted areas or locations at MPHS. Alternatively, such seeds and plants will also be able to be used in ecological and environmental education programs aimed at tourists and specialists, allowing for the recognition of species that are hardly known. Moreover, this will allow people to appreciate the variability of each species, one of which is *Masdevallia veitchiana*, known by the Quechua name of "Waqanki" ('you will cry'), a Peruvian endemic species considered the representative flower of Machu Picchu Historical Sanctuary. Other species valued for their colorfulness and durability are *Ada brachypus*, *Ada aff. euodes*, *Anguloa virginalis*, *Cyrtorchilus minax*, *C. volubile*; *Epidendrum aff. secundum*, known by its Quechua name "wiñay wayna", *Lycaste macrophylla*, *Masdevallia barlaeana*, *Phragmipedium caudatum*, *Telipogon antisuyuensis*, and species new to science such as *Kefersteinia koechlinorum*, *Masdevallia karineae*, *M. marizae*, *Maxillaria deniseae*, *Scelochilus sp.*, *Stanhopea marizaiana*, *Telipogon sp.*, as well as many records new to MPHS such as *Masdevallia antonii*, *Otoglossum weberbauerianum*, *Solenidiopsis sp.*, *Zootrophion sp.*, among others.



Lepanthes menatoi Luer & R.Vásquez
Foto: Carmen Soto

A common mental image people have regarding orchids is that of a species with large flowers and very bright colors; however, reality shows a very different pattern from that preconceived idea, and this can be experienced by going on a tour along the "Orchid Trail". For this, a magnifying glass will be needed in order to observe these miniatures.

ORQUIDEA

Ada aff. euodes (Rchb. f.) Bennett & Christenson
Foto: Carmen Soto



Some orchid flowers barely grow to a size of a few millimeters, camouflaged among trunks: *Lepanthes*, *Platystele*, *Stelis*, *Trichosalpinx* and some species of the *Pleurothallis* genus, which have lovely minute flowers of only 2 to 10 millimeters in size.



Trichosalpinx chamaelepanthes
(Reichenbach f.) Luer
Foto: Carmen Soto

ORQUIDEA

In contrast, there are species such as *Phragmipedium caudatum* which feature long, ribbon-shaped petals that reach as much as 80 centimeters in length, making them the largest orchidaceous flowers in MPHS and the world. Other species are fragrant and deliciously scented, like *Trichopilia fragrans* (with a penetrating jasmine-like perfume), *Odontoglossum praestans*, *Anguloa virginalis*, *Kefersteinia koechlinorum*, and *Pleurothallis revoluta*; yet others emanate their fragrances at nightfall, as is the case of *Ida fimbriata* (with a jasmine-honey scent).

For the appropriate management of this orchidarium, permanent research is required in order to learn about the species' ecology, habitat and growth habits. Regarding the ways the orchids grow in this habitat, it can be said that, firstly, most of them are epiphytes (growing on trees and bushes); secondly, some are terrestrial (growing at ground level); thirdly, others are lithophytes (growing on stones or rocky surfaces); then there is a very small group that are saprophytes (growing on abundant decomposing organic matter); and, finally, there are the hemi-epiphytes (the basal part of the plant roots in the soil and the higher part becomes epiphyte).



Evidently, to manage species in an orchidarium it is necessary to reproduce habitat factors such as light, humidity, temperature and nutrients, all of which are needed for the germination of the seeds, requiring very long vegetative periods and good balance (germination fungus / orchid seed-seedling symbiotic relationship).

ORQUIDEA



Echinosepala aspasicensis (Rchb. f.)
Pridgeon & M.W. Chase

JANUARY 2011

ORQUIDEA



Epiphytes such as *Hofmeisterella*, *Stelilabium*, *Rusbyella*, *Lepanthes*, *Lockhartia*, *Cyrtochillum*, *Oncidium*, *Odontoglossum*, *Maxillaria*, *Stenia*, *Scelochilus*, *Telipogon*, *Trichopilia*, etc. are fixed or tied using nylon fiber or raffia onto the branches or trunks of the abovementioned trees. A layer of moss is then placed over the roots with the purpose of providing humidity and also to serve as a mesh of sorts for the retention of organic detritus, allowing the plant to perfectly endure any climatic adversity without falling off – at least for as long as necessary until the roots of the plants can stay fixed by their own; other plants are placed on dead logs.

ORQUIDEA



Restrepiopsis tubulosa (Lindley) Luer
Foto: Carmen Soto



Lepanthes pteropogon Reichenbach f.
Foto: Carmen Soto

ORQUIDEA

Lithophytic species such as *Masdevallia veitchiana* (terrestrial/lithophyte) , *Masdevallia barlaeana*, *Anguloa virginalis*, *Phragmipedium caudatum*, *Ida fimbriata*, *Lycaste macrophylla*, *Ida locusta*, *Ida jamesiorum*, *Xylobium elatum*, *Prosthechea crassilabia*, *Trichoceros antennifer*, and some species of *Cyclopogon* and *Telipogon* are placed on rocky surfaces in paths (large rocks). In other cases, some rustic stone walls had to be built and combined with moss, over which the aforementioned species were fixed; not long after, the plants readapted and achieved vigorous growth.



Ida jamesiorum Oakeley
Foto: Benjamín Collantes

ORQUIDEA



Trichoceros antennifer (Humboldt & Bonpland) Kunth
Foto: Carmen Soto

In the case of terrestrial species such as *Sobralia dichotoma*, *Sobralia ciliata* (Presl) Schweinfurth ex Foldats, *Sobralia aff. setigera*, *Epidendrum bambusifforme*, *Epidendrum syringothyrsus*, *Bletia campanulata*, *Malaxis cf. andicola*, *Sauroglossum aurantiacum*, *Elleanthus conifer*, *Aa*, *Habenaria*, requirements are simpler: they are located according to the light and humidity they need and planted in soil substrate made up of dead leaves, humus and organic detritus. This whole process is implemented along the walls of the Orchid Trail.



Sobralia ciliata (Presl) Schweinfurth ex Foldats
Foto: Carmen Soto

ORQUIDEA



Sobralia ciliata (Presl) Schweinfurth ex Foldats forma alba
Foto: Carmen Soto

It is important to take into account that the roots of orchids need appropriate ventilation to avoid radicular rotting, as the optimum vegetative state of the plant will depend on the good conservation of its roots; therefore, well-preserved roots will translate into healthy plants.



Stenorrhynchos cernuus Lindley
Foto: Carmen Soto

ORQUIDEA



The type of the substrate will determine the kind of watering and nutrition required. Substrates that retain humidity well need little watering, and are used for orchids with finer roots such as *Lepanthes*, *Platystele*, *Trichosalpinx*, *Telipogon*, *Stelis*. On the other hand, when the moss is quite loose, watering is required with more frequency, as in most *Phragmipedium*, *Sobralia*, *Pleurothallis*, *Sauroglossum*, *Prosthechea*. In the case of epiphytic *Epidendrum*, either with or without moss, frequent watering is required. Along the Orchid Trail, the following species and their pollinators have been observed:

Anguloa virginalis by the *Euglossa* sp. bee; *Elleanthus capitatus* by the *Leucippus viridicauda* hummingbird (green-and-white hummingbird), the *Leucippus chionogaster* hummingbird, (white-bellied hummingbird), and the *Ocreatus underwoodii* hummingbird (booted racket-tail hummingbird); *Epidendrum paniculatum* and *Scelochilus rubriflora* by the glasswing butterfly (Ithiminae), though in this case the whole circuit of the pollination mechanism has not been able to be observed; and *Stanhopea marizaiana* by the *Euglossa* sp. bee.

ORQUIDEA



Epidendrum paniculatum Ruiz & Pavón
Foto: Carmen Soto

Worthwhile mentioning is that Inkaterra Machu Picchu Pueblo Hotel hopes to develop a program to obtain seeds from native species to be disseminated throughout the habitat, aiming at fostering the repopulation of species in places that have been impacted, or in other areas where a significant decrease has been detected in their populations. The propagation of species in natural conditions by means of seeds is a very long process and takes at least five to seven years until plants reach adulthood, when they generate their first flowering indicating their maturity.

Finally, we would like to thank our team of ecologic gardeners, Ermitaño Quispe, Germán Villena, Andrés Quispe, Daniel Aucayllo, Braulio Supa, Cecilio Cáceres, Bernardino Arenas, Marcelino Durand and Nicasio Ccopa, for their efficient work that has enabled us to learn about, and preserve, the species along the Orchid Trail, several of which are new to science, not to mention the numerous reports new to MPHS.

RECORDS WHICH ARE NEW TO MACHU PICCHU HISTORICAL

SANCTUARY*Brachionidium carmeniae* Luer, sp. nov. Variable in size, this plant is approximately 10 cm or taller, grows terrestrial on *Sphagnum* (a kind of moss), has clearly lacerated leaves, bears a solitary flower of 1.5 cm in diameter with translucent sepals and petals and deep purple-red veins, and blooms from August to October featuring ephemeral flowers (lasting two to three days). It is spread throughout the higher parts of the Alccamayo ravine, between 3000 and 3200 m.a.s.l. It appears to be an endemic species of Machu Picchu.

ORQUIDEA

Brachionidium carmeniae Luer
Foto: Carmen Soto



Brachionidium inkaterrense Luer & C.Soto, *sp. nov.*

This plant, dedicated to Inkaterren, is variable in size (10 cm or taller), grows terrestrial, has coriaceous leaves, bears a solitary flower of 1 to 1.5 cm in diameter with translucent sepals and petals, deep purple-red veins and densely ciliated petal edges, and blooms in October featuring ephemeral flowers (lasting two to three days). It is spread throughout the higher parts of the Alccamayo ravine, between 3000 and 3200 m.a.s.l. It appears to be an endemic species of Machu Piccu.



Brachionidium inkaterrense Luer & C.Soto, *sp. nov.*
Foto: Carmen Soto

ORQUIDEA

Cryptocentrum inaequisepalum Schweinfurth

This epiphyte or terrestrial plant is 29 cm tall and has meaty leaves. Inflorescence basal, lateral, single-flowered: Fragrant flowers with green sepals tinted with a pale yellowish brown, greenish petals around the base, and green-yellowish labellum; floral base ends in a spur forming a nectary. Blooms in November-December.



Cyrtidiorchis aff. *rhomboGLOSSa* (Lehmann & Kraenzlin) Rauschert

This epiphyte is 45 cm tall and has an ovoid pseudobulb. Inflorescence axillary, single-flowered: Flowers have pale red sepals and petals with purple veins; anterior labellum is 1/3 light red, basal is 2/3 purple-red. Blooms from January to March.



ORQUIDEA

Epidendrum amaruense Hágsater, Collantes & Santiago

This epiphyte is 78 cm tall.

Inflorescence apical, in panicle: Non-resupinate flowers of 1 cm in diameter with yellow to green-ochraceous sepals, petals and labellum; sepal margin is tinted with a light-brownish red.

Blooms from January to March.



Epidendrum amaruense Hágsater, Collantes & Santiago
Foto: Carmen Soto

Epidendrum frechetteanum Bennett & Christenson

This epiphyte is 8.5 cm tall.

Inflorescence sessile, apical, single-flowered: Flower is 3 cm in diameter with pale pink to brownish pink sepals and petals, and a whole brownish pink labellum.

Blooms from April to June, and in September-October.



Epidendrum frechetteanum Bennett & Christenson
Foto: Carmen Soto

ORQUIDEA

Epidendrum pachacutegianum Hágsater & Collantes

This epiphyte is 9 to 11 cm tall with a thickened terete pseudobulb.

Inflorescence terminal, in panicle of 2 cm in length, erect: Non-resupinate flowers of 1.5 cm in diameter with pale copperish pink sepals and petals, and pink to creamy green labellum.

Blooms from September to November.



Epidendrum quispei Hágsater & Collantes

This pendulous plant is a 17 to 38 cm tall epiphyte.

Inflorescence apical, pendulous, in panicle: Resupinate flowers of 1.5 cm in diameter with almost white to ochraceous pink sepals, petals and labellum.

Blooms from September to November.

ORQUIDEA



Epidendrum quispei Hágsater & Collantes
Foto: Benjamín Collantes

Gongora rufescens Jenny

This epiphyte is 32 to 64 cm tall with an oblong-ovoid pseudobulb. Inflorescence pendulous, basal, in panicle, about 50 cm tall: Flower is 4.5 cm in diameter with dark golden yellow sepals with brick-red spots, hyaline pale topaz-colored petals with brownish spots, and bright yellow labellum covered with brownish spots. Blooms in March-April, July-August, and November.

ORQUIDEA



Gongora rufescens Jenny
Foto: ¿

Lepanthes alticola Schweinfurth

This plant is approximately 6m tall.

Inflorescence in panicle of 5 cm in length: Flowers are 1 cm in diameter, very attractive, blooming from under the leaves, with yellow to tan sepals with disperse red, red-faded yellow petals, and red or yellow labellum.

Blooms in April, August-September, and December.

ORQUIDEA



Lepanthes alticola Schweinfurth
Foto: Carmen Soto

Lepanthes pubicaulis Schweinfurth

This caespitose epiphyte is 7.5 cm tall.
Inflorescence in panicle: Flowers are 1.2 cm in diameter, very attractive, blooming from under the leaves with sepals forming an equilateral triangle.
Blooms from January to March, and from June to December.

ORQUIDEA



Lepanthes pubicaulis Schweinfurt
Foto: Carmen Soto

Maxillaria acutifolia Lindley

This epiphyte is approximately 20 cm tall with ellipsoid pseudobulbs. Inflorescence basal, single-flowered: Flowers are 3 cm in diameter with greenish dorsal sepal, melon-colored lateral sepals, very light pale green petals, and melon-orange labellum with small reddish spots. Blooms from September to November.



Maxillaria acutifolia Lindley
Foto: Carmen Soto

ORQUIDEA

Maxillaria longipetala Ruiz & Pavón

This epiphyte is approximately 50 cm tall with an ovoid pseudobulb.

Inflorescence basal, single-flowered: Flower is 10 cm in diameter with intense yellow sepals, white base, yellow and brown exterior; intense yellow petals, base with dark pink streaks; labellum with middle lobe featuring whitish edges and yellow center, and lateral lobes with pink-purple lines.

Blooms in November-December.



Maxillaria longipetala Ruiz & Pavón
Foto: Carmen Soto

Scelochilus janeae Dodson & Vásquez, N.R.S.

This epiphyte is 8 cm tall and has an ovoid pseudobulb.

Inflorescence basal, in panicle: Flower is 1.7 cm in diameter with orange sepals, orange petals with red stripes, and orange labellum with red stripes, pubescent from the middle to the apex.

Blooms from February to April.

ORQUIDEA



Scelochilus janeae Dodson & Vásquez
Carmen Soto

Sobralia crocea (Poeppig & Endlicher) Reichenbach f., N.R.S.

This medium-sized terrestrial plant is about 54 cm tall, has no pseudobulb, and is one of the smallest of its genus.

Inflorescence in succession, single-flowered: Flower is 2.5 cm in diameter with bright orange sepals, and orange petals and labellum.

Blooms from February to May, and in December.

ORQUIDEA



Sobralia crocea (Poeppig & Endlicher) Reichenbach f.
Foto: Benjamín Collantes

Sobralia crocea (Poeppig & Endlicher) Reichenbach f., N.R.S.

This epiphyte is 50 to 60 cm tall with an ovoid pseudobulb. Inflorescence pendulous, basal, in panicle: Flower is 12 cm in diameter with beige sepals and petals with red-brownish irregular rings, spots and dots, beige labellum with fine red dots or spots, and a complex fragrance. Blooms in December-January.

ORQUIDEA



Stanhopea marizaiana Jenny
Foto: Benjamín Collantes

Foto: Benjamín Collantes

Vasqueziella boliviana Dodson

This lithophytic and terrestrial plant is 72 cm tall with a pyriform pseudobulb.

Inflorescence pendulous, in panicle of 17 cm in length: Flower is 2 cm in diameter with a delicate diurnal fragrance, and meaty pale-yellow sepals, petals and labellum; column with abundant whitish pubescence.

Blooms from August to October.



Vasqueziella boliviana Dodson
Foto: Carmen Soto



ORQUIDEA

Zootrophion aff. dayanum (Reichenbach f.) Luer E.N.P.

This medium-sized epiphyte has no pseudobulb.
Inflorescence single-flowered.
Blooms from October to December.



Zootrophion aff. dayanum (Reichenbach f.) Luer
Foto: Dr. Isaías Rolando

ORQUIDEA

Brachionidium elegans Luer & Hirtz

Record New to MPHS



Brachionidium elegans Luer & Hirtz
Foto: Carmen Soto

Acknowledgements

We would like to thank Carmen Soto, dear friend of our Club, who offered to prepare this first bulletin 2011.

About Orquídea, the Peruvian Orchid Club bulletin

We hope you have enjoyed reading *Orquídea*, already in its 29th issue, whereby we wish to keep our friends around the world informed about the enormous variety of Peruvian orchids, their cultivation and reproduction.

Annual subscription for twelve issues costs US\$ 30. If you are interested in subscribing to the bulletin, please contact us at the following email address:

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Happy New Year !