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The orchids of the Aegean island of Herakleia (Cyclades) and *Ophrys heracleotica* GAVALAS, KREUTZ & Z. ANTONOPOULOS, a new *Ophrys* species

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Keywords:

Orchidaceae; *Ophrys heracleotica* GAVALAS, KREUTZ & Z. ANTONOPOULOS, Greece, Cyclades, Herakleia, *orchid* distribution on Herakleia; ecology, flora of Greece.

Summary:

ANTONOPOULOS, Z., GAVALAS G. & C.A.J. KREUTZ (2010): The orchids of the Aegean island of Herakleia (Cyclades) and *Ophrys heracleotica* GAVALAS, KREUTZ & Z. ANTONOPOULOS, a new *Ophrys* species. - Ber.Arbeitkr.Heim.Orchid. 27 (2) 2010: 266-281.

In this article for the first time the *orchid* flora of the Greek island Herakleia has been investigated and listed. Further, *Ophrys heracleotica* has been described as a new *Ophrys* species. It belongs clearly to the *Ophrys lutea* group. The characteristics of this species are listed and compared with *Ophrys lutea* subsp. *melenae* RENZ and *Ophrys praemelenae* S. HERTEL & H. PRESSER.

Zusammenfassung:

Die Orchideen der Ägäische Insel Herakleia (Kykladen) und *Ophrys heracleotica*, eine neue *Ophrys*-Art. - Ber.Arbeitkr.Heim.Orchid. 27 (2) 2010: 266-281.

In diesem Beitrag wird erstmals über die Orchideen der griechischen Kykladen Insel Herakleia berichtet, die einzelnen Taxa werden aufgelistet. Des weiteren wird *Ophrys heracleotica* beschrieben, eine neue *Ophrys*- Sippe aus der *Ophrys lutea*-Gruppe. Die charakteristische Merkmale werden aufgeführt. Außerdem wird sie mit *Ophrys lutea* subsp. *melenae* Renz and *Ophrys praemelenae* S. HERTEL & H. PRESSER verglichen.

Περύληψη

Αντωνοπουλος, Ζ. Γαβαλας, Γ. & C.A.J. KREUTZ (2010): Οι ορχιδέες της Ηράκλειας (μικρές Κυκλάδες) και η *Ophrys heracleotica* GAVALAS, KREUTZ & Z. ANTONOPOULOS, ένα νέο είδος *Ophrys*. - Ber.Arbeitkr.Heim.Orchid. 27 (2) 2010: 252-267.

Στο παρόν άρθρο, μελετώνται για πρώτη φορά συστηματικά οι ορχιδέες της νήσου Ηρακλειάς (Κυκλάδες). Επιπλέον, περιγράφεται η *Ophrys heracleotica* ως νέο είδος του γένους *Ophrys*. Ανήκει σαφώς στην ομάδα *Ophrys lutea*. Τα χαρακτηριστικά του είδους αναλύονται και συγκρίνονται με αυτά των *Ophrys lutea* subsp. *melena* RENZ και *Ophrys praemelena* S. HERTEL & H. PRESSER.

Introduction

Geography and Climate: Herakleia island lies south of Naxos and surrounded by the northern parallels 36° 52' 18'' and 36° 49' 08'', and the eastern meridians 25° 24' 54'' and 25° 28' 54''. It belongs to the small East Cyclades, a group of islands located between Naxos, Ios and Amorgos. Its surface is 18.1 square km and the maximum altitude is 418 m. The coastline is 29.2 km long. Around Herakleia there are smaller islands, most significant the rocky "small Avelas", the "big Avelas" and "Venetiko" islands. The climate is typical Mediterranean. Main features are the mild and dry winters, cool summers and the annual winds, a strong northerly wind that blows in summer, especially during the day. The dominant winds are north. Another feature is the sunshine and low precipitation, often in the form of short thunderstorms. The climate is influenced by the mountains

of Naxos, located just 3 miles to the north. This has led to limited rains when north winds blow, after the mountain Zas (1.004 m) acting as a natural barrier to rain clouds. Another result is the lowest intensity of northern winds in the triangle Herakleia-Schinoussa-Naxos and is perhaps the most protected from winds around the Cyclades. Extreme temperatures have been recorded; from -2 to 38 degrees Celsius. In rare cases, snow has been observed, for example in January 1983 and February 2008 the island was covered by snow for three days. Habitats and Flora: The island has a wide variety of habitats. Maquis, brushwood, abandoned terraces, olive groves, plains with non-irrigated winter crops, rugged coastlines, sandy and rocky beaches, caves, rocks and abandoned small settlements have resulted in an unexpectedly high biodiversity despite the small size of the island.

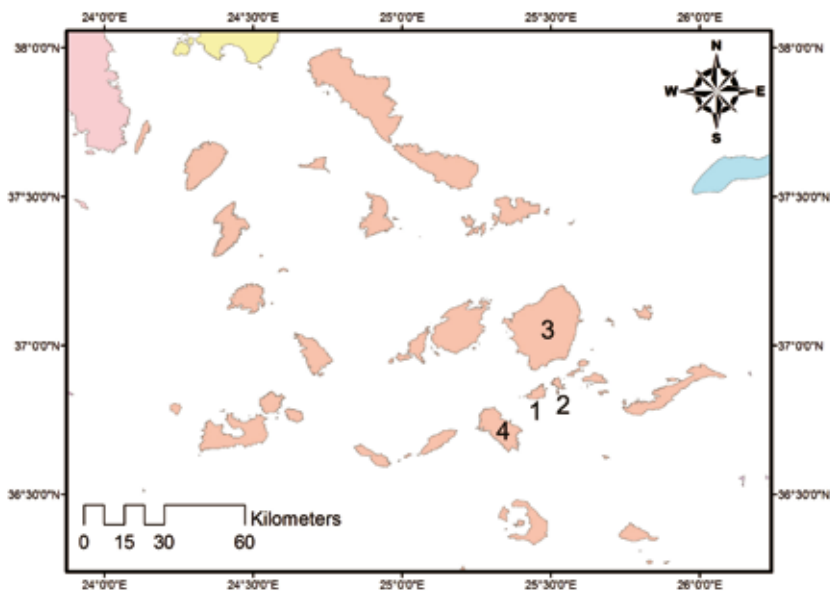


Fig. 1: Cyclades with Herakleia (1), Schinoussa (2), Naxos (3), and Ios (4).

The flora of Herakleia is rich despite the small size of the island. This is due to a variety of habitats available. The effect of strong winds and lack of regular rainfall, are the reason that the plants are small and adapted with survival mechanisms for major droughts. The soil has the ability to retain and store even the smallest amounts of water. At the end of July 2010, 550 species of plants had been identified, by Giannis GAVALAS, a local researcher, who lives at Herakleia for many years and it is estimated that the total number of species is between

600 and 700. One of the most important families, the Orchids, is numbering at least 30 taxa, one of them, *Ophrys heracleotica*, probably endemic to the island.

There is a network of 16.5 km labeled paths along the whole island which allows visitors to access to the majority of orchid biotopes. Large areas without fences allow free searching for orchids outside the trails. Traditional stone walls are usually of low magnitude and do not create problems to the individual researcher.

Due to the existence of calcareous rocks, the many abandoned cultivations and lack of many grazing animals, in comparison to other Cycladic islands, Herakleia hosts a large number of orchids, most of them belonging to genus *Ophrys*. The best orchid biotopes in Herakleia are the abandoned terraces which face the North. During winter months that most of the orchids are growing in leaves, the sun lies low to the horizon and these places are under shadow protected from extreme dryness. Phrygana and bushes protect the orchids from strong winds, hail, cold, sunlight and grazing animals. The flowering period of Herakleia's wild orchids extends from the end of December to the end of May, with the exception of *Spiranthes spiralis* which blooms from mid-September through November.

General remarks about the orchids of Herakleia

***Ophrys*:** The genus *Ophrys* dominates the island with some species occurring very frequently in relation to the large and well studied Naxos. For example *Ophrys icariensis* and *Ophrys blitopertha* are amongst the most abundant orchids, flowering at end of March, whilst in Naxos they are very rare and restricted to the east seashores. On the contrary, *Ophrys*

cretica is absent from Herakleia, whilst *Ophrys ariadnae* grows there in abundance.

Ophrys aegaea is another particularity of Herakleia's orchid flora. It is not rare during February where most plants are in flowers. It seems that it is absent from Naxos. Plants are very typical and similar to Karpathos' specimens.

The *Ophrys tenthredinifera* group is represented only by one early flowering taxon with small flowers (lip length around 1 cm). It flowers most of the years, together or just after *Ophrys basilissa* and most probably belongs to subspecies *Ophrys tenthredinifera* subsp. *villosa*.

Ophrys icariensis shows, at least in Herakleia, two flowering waves, so its flowering period extends from early January to the end of April. There are no real differences between early and late plants, but second wave plants are usually smaller in height and prefer coastal poor soils. It is particularly common in Herakleia, it was found also at Schinoussa island, which is very close to Herakleia, and most probably exists on other small islands in the triangle between Ikaria, Naxos and Herakleia (Koufonissia, Donoussa, Keros).

Ophrys cinereophila is represented only by a small population of few individuals. The plants show a relatively flat lip and for this reason they can be easily misinterpreted as the rhodian *Ophrys parvula*. Strangely, *Ophrys cinereophila* is not rare at Schinoussa island.

Like in Naxos and Paros, there are few plants very similar to the Cretan *Ophrys heldreichii*. Most of the plants from this unique taxon of the Cyclades have big fucifloroid lips and seem identical with *Ophrys calypsus* from the eastern Aegean islands. It is not clear if these plants can be classified as very variable *Ophrys heldreichii* or, vice versa, to *Ophrys calypsus* with its varieties or to *Ophrys heldreichii* subsp. *pseudoapulica*. Maybe, Cycladic plants constitute a transitional population between typical Cretan *Ophrys heldreichii* and the east Aegean *Ophrys calypsus*. Maybe all the plants of Aegean basin belong to the same species, given that, Cretan *Ophrys heldreichii* is very rarely fucifloroid, east Aegean *Ophrys calypsus* are rarely *scolopaxoid* and Cycladic plants, located at the middle of distribution, are equally *scolopaxoid* and *fucifloroid* in their range of lip shape variability.

The new species *Ophrys heracleotica* is very abundant in Herakleia island. Despite the proximity to Naxos and Schinoussa, *Ophrys heracleotica* is absent from both neighboring islands. It is a unique endemic to Herakleia, probably of a recent hybridogenic origin with *Ophrys phryganae* and *Ophrys blitopertha* being most probably its parental species.

Serapias: *Serapias orientalis* is well represented by many plants in Herakleia. They belong to the typical form (*Serapias orientalis* subsp. *orientalis*) and flower from end of February to early May. Only one plant of *Serapias parviflora* was found at the center of the island by Giannis GAVALAS at 7th of April 2008. The plant vanished the next years, most probably eaten by goats. Also, in the very small rocky island Venetiko, close to the entrance of Herakleia port, in March 2010, Giannis GAVALAS found only one specimen of *Serapias bergonii*, being the only orchid in the whole island!

Orchis: Two species in this genus, *Orchis anatolica* being abundant and growing everywhere in the island, sometimes beginning flowering from early January and *Orchis anthropo-*

Table 1: List of orchid species of Herakleia island, with their blooming period and the relative abundance.
 *=rare, **=common, ***=very common. The list is based on personal records of Giannis Gavalas.

Genus	Species	Flowering period	Abundance
Ophrys	aegaea	II-III	**
	ariadnae	II-IV	**
	basilissa	XII-III	**
	blitopertha	III-V	***
	bombyliflora	I-III	**
	calypsus	II-IV	**
	ceto	IV-V	***
	cinereophila	III-IV	*
	ferrum-equinum	II-IV	***
	gortynia	IV-V	**
	heldreichii	II-IV	**
	heracleotica	III-IV	**
	icariensis	I-IV	**
	iricolor	II-IV	**
	israelitica	II-IV	**
	omegaifera	II-IV	**
	phryganae	III-IV	**
	sicula	II-IV	***
	tenthredinifera	I-III	**
Neotinea	maculata	III-IV	**
Orchis	anatolica	I-V	***
	anthropophora	III-IV	*
Anacamptis	collina	I-IV	***
	fragrans	IV-V	**
	papilionacea	I-III	***
	pyramidalis	III-V	***
	sancta	IV-V	***
Serapias	orientalis	II-V	**
	bergonii	III	*
	parviflora	III-IV	*
Spiranthes	spiralis	IX-XI	*

phora with is very rare with only one population of a few individuals at the western part of Herakleia.

Anacamptis: As in most Cyclades, *Anacamptis sancta* is common on Herakleia. It frequently forms hybrid swarms with *Anacamptis fragrans*. *Anacamptis papilionacea* subsp. *heroica* is one of the first flowering orchids, from beginning of January. *Anacamptis collina* flowers in two discrete waves, a situation known also from Crete, first wave from early January to mid February and second one from early March to late April. The second wave usually holds numerous plants which are more robust.

***Ophrys heracleotica* GALVAS, KREUTZ & Z. ANTONOPOULOS spec. nov.**

Holotype: Greece (Cyclades): North of Iraklia (Herakleia), leg. Z. ANTONOPOULOS (26.03.2010), L.

Etymology: Herakleia island was named after Heracles, which is the greek name for Hercules. Because of the fact that *Ophrys heracleotica* only grows on Herakleia island the name derives from the island of Herakleia.

Diagnosis: *Ophrys lutea* subsp. *melena proxima*, habitu humili (10-30 cm), labello minore (8-14 mm longo) margine lato indistincte limitato atroluteo ad luteoloviridi raro aurantiaceo, basi valde V-formiter incisa, lobis lateralibus rotundatis bifidis rima basali, anthesi sera (medio ad finem Martii) differt. Praeterea labello atrobrunneo, decore conspicue diviti interdum marmorato planis azurulis ad argenteocinereis vel atroviolaceis nitentissimis.

Description: The species is between 10 and 30 cm tall with a dense inflorescence and 2 to 8 flowers. The flowers are predominantly horizontally on the inflorescence. The sepals are mostly coloured yellowish green, the petals are more yellow. The lip is small to mid-large, only 8-14 mm in length, oval to longly-oval, trilobed (with shallow notches between the middle and the lateral lobes), rounded and slightly or strongly curved downwards, forming a strong knee at its base. The lateral lobes are rather big, curved downwards, some times very strongly, the ends again curved upwards. The middle lobe is divided. The colour of the labellum is dark brown to reddish-brown. The speculum is spread until half of the labellum length, very typically coloured, mostly marmorated with blur blue



Fig. 2: *Ophrys heracleotica*, Greece (Cyclades): Iraklia (Herakleia), 27.03.2010, [Z. Antonopoulos].

or usually brownish spotted, most of the times with an Ω at the lower end of the lip. In addition the speculum is delimited in the upper region by two separated oblong-ovoid, bluish to bluish-grey or dark violet-coloured high-gloss surfaces. The speculum strongly resembles *Ophrys parosica*. The edge of the lip has mostly a very wide bright yellowish or yellow-green border or a rarely diffused orange-coloured margin. The lip has a deep V-shaped groove at the base with hairs.

Comprehensive german description:

Ziemlich kräftige, niedrige Pflanze, 10 bis 30 cm hoch. Stängel kräftig, aufrecht, hellgrün bis grün. Laubblätter hellgrün bis gelblichgrün; die unteren breit eiförmig-lanzettlich bis oval, größte Breite im unteren Drittel, am Grunde rosettig gehäuft; die oberen eiförmig-lanzettlich bis lanzettlich, aufgerichtet, stängelumfassend, den Blütenstand nicht erreichend. Blütenstand relativ locker und langgestreckt mit 2 bis 8 Blüten, manchmal auch nur mit einer Blüte. Blüten mittelgroß, vorwiegend waagerecht, selten schräg von der Blütenstandsachse abstehend. Tragblätter hell- bis gelblichgrün, lanzettlich, steil aufwärts gerichtet, eingerollt, länger als der Fruchtknoten. Sepalen

einfarbig gelblich, gelblichgrün bis hellgrün gefärbt; das mittlere Sepal breit-oval, stark vornübergebeugt; die beiden seitlichen breit eiförmig-lanzettlich bis breit eiförmig, schräg abstehend bis leicht nach vorne gebogen, stumpf bisweilen kurz zugespitzt. Petalen länglich-lanzettlich bis lanzettlich, dunkelgelb, gelblich bis gelblichgrün, nur selten an den Rändern etwas bräunlich überlaufen, am Rande gewellt, nach vorne gebogen, etwa ein Drittel bis halb so lang wie die beiden seitlichen Sepalen. Lippe oval bis länglich-oval, mit breiten Seitenlappen und abgerundetem, zweigeteiltem Mittellappen, waagrecht bis schräg abstehend, mit deutlichem basalem Knick an der Lippenbasis, klein bis mittelgroß, 8 bis 14 mm lang und 6 bis 10 mm breit, flach ausgebreitet, auffallend dunkelbraun bis rötlichbraun gefärbt, am Rande von einem sehr breiten dunkelgelben bis gelblichgrünen, selten orangefarbenen unscharf begrenzten Saum umgeben, im apikalen Teil dreilappig, an der Lippenbasis deutlich V-förmig eingekerbt, sehr kurz behaart. Seitenlappen breit ausladend, meist deutlich nach unten eingerollt, die Seitenkanten im apikalen Bereich meist nach außen gewölbt, die Ränder meist rötlichbraun angehaucht. Mal bis über die Lippenhälfte reichend, besonders reich



Fig. 3: *Ophrys heracleotica*, Greece (Cyclades): Iraklia (Herakleia), 27.03.2010, [Z. Antonopoulos].

gegliedert bisweilen marmoriert und ausgedehnt, von der Lippenbasis aus zwei mehr oder weniger geteilten, großen, länglich-eiförmigen, bläulich bis silbriggrauen oder dunkelviolettfärbten stark glänzenden Flächen bestehend. Anhängsel fehlt.

Habitat: Open phrygana, brush-wood, scrub, stony wasteland and abandoned terraces; on calcareous or basic, dry soil.

Flowering time: From the middle to the end of March. A relatively late flowering species, the same time as *Ophrys phryganae* and about 2-3 weeks after *Ophrys sicula*.

Altitudinal distribution: From sea level until 250 m.

Distribution: Endemic to the Island of Herakleia (Cyclades) in Greece, a small island south of Naxos and between Ios and Schinoussa. *Ophrys heracleotica* is absolutely limited to the island of Herakleia. ANTONOPOULOS, GAVALAS and ELLENBAST searched for many hours on the neighbouring Schinoussa, an island only 2-3 kilometers away from Herakleia, and found not one plant of *Ophrys heracleotica* there. Also ELLENBAST stayed at Naxos for many days during the beginning of April 2010 and

he searched the whole island very thoroughly, but failed to find *Ophrys heracleotica*.

Ophrys heracleotica is on Herakleia widely distributed and not rare. Locally the species forms large colonies of flowering plants. It is more numerous than *Ophrys phryganae* and slightly less common than *Ophrys sicula*. *Ophrys heracleotica* is very abundant on the island, but missing from neighbouring Naxos and Schinoussa islands.

Ophrys heracleotica, *Ophrys lutea* subsp. *melena* and *Ophrys praemelena*.

In general the plants of *Ophrys heracleotica* are between *Ophrys lutea* subsp. *melena* and *Ophrys praemelena* in size, the number of flowers is greater and between 2 and 8 flowers. The lip of *Ophrys heracleotica* is slightly smaller than *Ophrys lutea* subsp. *melena* and *Ophrys praemelena*. It usually has a wide and diffused dark yellow to yellowish green border and a spotted (marmorated) speculum, that is suffused with a silvery gloss. Compared to *Ophrys lutea* subsp. *melena* it has a bending lip base and a more dull, blurred speculum and lip coloration. Compared to the lip of *Ophrys praemelena*,



Fig. 4: *Ophrys heracleotica*, Greece (Cyclades): Iraklia (Herakleia), 27.03.2010, [Z. ANTONOPOULOS].

Table 2: Comparison with *Ophrys lutea* subsp. *melenae* and *Ophrys praemelenae*.

	melenae	praemelenae	heracleotica
plant height (cm)	10-50	10-25	10-30
lip length (mm)	10-14.5	10-14	8-14
macula color	blue - grey	blue grey	grey silver, spotted
Lip base bending	attenuated	strong	strong
yellow border	narrow to wide	narrow	wide
lip center color	dark brown	dark brown to reddish	dark brown to reddish, usually spotted
Basal groove	shallow	shallow and small	deep and long
Flowering time	late	early	late
altitude (m)	0-1300	0-640	0-250

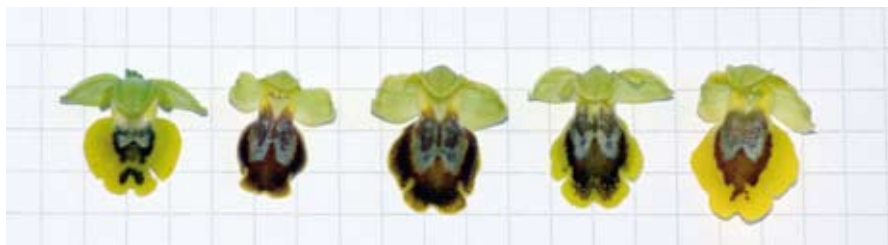


Fig. 5: From left to right: *Ophrys sicula*, *Ophrys heracleotica* (3x) and *Ophrys phryganae* (all from Herakleia island).

which has an indistinct, shallow and narrow but short V-shaped groove at the base, the flowers of *Ophrys heracleotica* are characterised by a striking und longer V-shaped groove at the base.

Ophrys heracleotica has a considerably later flowering time, about the same time as *Ophrys blitopertha*, together with the first flowers of *Ophrys ceto* and *Ophrys gortynia*, about 2-3 weeks later than *Ophrys sicula* and about the same as *Ophrys phryganae*.



Fig. 6: Distribution of *Ophrys phryganae* on Herakleia.



Fig. 7: Distribution of *Ophrys sicula* on Herakleia.



Fig. 8: Distribution of *Ophrys heracleotica* on Herakleia.

In contrast, *Ophrys praemelena* flowers very early, in Epirus, which is located much more to the north than Herakleia, in mid March the flowers are already fading.

On Herakleia also the close relatives *Ophrys sicula* and *Ophrys phryganae* are distributed. Compared to the first species *Ophrys heracleotica* is rare and the flowers are a little bit larger; compared to *Ophrys phryganae* it is more widely distributed and, the flowers are clearly smaller.

Ophrys heracleotica is a remarkable species with very coloured flowers. It is an endemic species from Herakleia probably of a recent hybridogenic origin with *Ophrys phryganae* and *Ophrys blitopertha* being most probably its parental species, both of which are distributed on Herakleia.



Fig 9: Collage of *Ophrys heracleotica* on Herakleia (Cyclades), 27.03.2010 [Z. ANTONOPOULOS].

Acknowledgements

We wish to express our thanks to Michael LOWE (Brancepeth, UK) and James MAST DE MAEGHT (Brussels, Belgium) for critically reading the text.

Literature

ANTONOPOULOS, Z. (2009): The bee Orchids of Greece. The genus *Ophrys*. -Mediterraneo Editions.

BAUMANN, H., KÜNKELE, S. & R. LORENZ (2006): Die Orchideen Europas mit angrenzenden Gebieten.- Ulmer Verlag, Stuttgart.

DELFORGE P. (1995): Les Orchidées des îles de Paros et Antiparos (Cyclades, Grèce). Observations, cartographie et description d'*Ophrys parosica*, une nouvelle espèce du sous-groupe d'*Ophrys fusca*. - Natural. belges 76 (Orchid. 8): 144-221.

DELFORGE, P. (2005): Guide des Orchidées d'Europe d'Afrique du Nord et du Proche Orient.- Delachaux et Niestlé S.A., Lausanne - Paris.

HERTEL, S. & H. PRESSER (2010): Neue Erkenntnisse zu den Orchideen in Griechenland. - Ber. Arbeitskrs. Heim. Orchid. 27 (1): 146-202.

KRETZSCHMAR, G. & H. (1996): Orchideen der Insel Naxos. - Ber. Arbeitskrs. Heim. Orchid. 13 (1): 4-30.

KREUTZ, C.A.J. (2004): Compendium der europäischen Orchideen.- Kreutz Publishers, Landgraaf.

KREUTZ, C.A.J. (2005): Korrekturen und Ergänzungen zum Compendium der europäischen Orchideen / (Catalogue of european Orchids).- Eurorchis (17): 97-128.

KREUTZ, C.A.J. (2007): Neukombinationen und Ergänzungen zu verschiedenen europäischen Orchideentaxa.- Ber. Arbeitskrs. Heim. Orchid. 24 (1): 142-186.

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Manuscript was submitted 23.10.2010.