

Cynorkis hasinai Hervouet & Ranaivo, sp. nov.
(Orchidaceae, Orchidioideae, Habenariinae),
a new species from Madagascar

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Madagascar,
Cynorkis,
new species.

ABSTRACT

A new species of Orchidaceae, *Cynorkis hasinai* Hervouet & Ranaivo, sp. nov., discovered in the north of Madagascar, is described and assigned to section *Parviflorae*. It has a very distinctive uppermost 5-lobed lip and the closest species is *Cynorkis schlechteri* H.Perrier.

RÉSUMÉ

Cynorkis hasinai Hervouet & Ranaivo, sp. nov. (Orchidaceae, Orchidioideae, Habenariinae), une nouvelle espèce de Madagascar.

MOTS CLÉS

Madagascar,
Cynorkis,
espèce nouvelle.

Une nouvelle espèce d'Orchidaceae, *Cynorkis hasinai* Hervouet & Ranaivo, sp. nov. découverte dans le nord de Madagascar est décrite et attribuée à la section *Parviflorae*. Elle possède un remarquable labelle supère pentalobé. L'espèce la plus proche est *Cynorkis schlechteri* H.Perrier.

INTRODUCTION

The genus *Cynorkis* Thouars, now comprising around 185 species, the largest terrestrial orchid genus in Madagascar with 139 species, was created by Thouars. In the same work he created the genus *Amphorkis* Thouars to accommodate species similar to *Cynorkis* but with inversed, i.e. not resupinated, flowers (Thouars 1809). Later in 1895 Frappier also created the genus *Hemiperis* Frapp. ex Cordem. for *Cynorkis*-like plants with inversed flowers in Réunion island (Cordemoy 1895). All former *Amphorkis* and *Hemiperis* are now included in the section *Parviflorae* of the genus *Cynorkis*, a section created by Ridley (Ridley 1885) and redefined by Cribb & Hermans (Cribb & Hermans 2009), but not all species of this section have inversed flowers. In this section, which was also called section *Hemiperis* by Perrier de la Bâthie (Perrier 1939: 74-117) but never validly published, we have around 49 species in Madagascar. Among these species a dozen only have inversed flowers, which are the first group of Perrier's section *Hemiperis*. *Cynorkis cuneilabia* Schltr. is now excluded of this group because, unlike what says the original description (Schlechter 1924: 45), flowers are resupinated on the type and in fresh specimens. Even this small number of Madagascar *Cynorkis* species with inversed flowers needs a revision. For example, there is a lot of confusion around *Cynorkis ridleyi* T.Durand & Schinz, with synonyms like *Cynorkis heterochroma* Schltr. and *Cynorkis moramangana* Schltr. which are most probably different species, though possibly synonyms of others. *Cynorkis squamosa* (Poir.) Lindl., initially known from La Réunion, has long been overlooked in Madagascar and its specimens labelled in herbaria *Cynorkis ridleyi*. The true *Cynorkis ridleyi* has a thin spur with a kind of hook at the tip, as stated in the description, which is still clearly visible on dry material. In order to clear up taxonomic issues, phylogenetic studies of *Habenariinae* of the genera *Benthamia*, *Cynorkis* and *Habenaria*, coupled with field researches, are currently done in a joint effort of the Muséum national d'Histoire naturelle in Paris, University of La Réunion and Kwazulu-Natal University. It will help characterize the genus *Cynorkis* which is certainly not monophyletic.

In this paper we present a new species of *Cynorkis* belonging to the section *Parviflorae* and with inversed flowers. As will be seen it is remarkably different from all other species in the group and can be readily distinguished. It was first discovered during a visit of the first author in February 2020 in the Montagne d'Ambre National Park, in the Diana region of Madagascar (formerly Antsiranana), which is situated at the extreme North of the country. Only one flowering plant could be found and only pictures were made. When it appeared that the species was undoubtedly new and quite distinct, a new visit in the same place was organised in April 2024, with the second author who collected samples which have been deposited in Tsimbazaza (herbarium TAN). In 2025, three specimens labelled *Cynorkis* sp. and corresponding to this species, also collected in Montagne d'Ambre and dating back to 1970, 1993 and 2008, were discovered in Paris (herbarium P), with indications that the second one has also been deposited in herbarium MO.

MATERIALS AND METHODS

HERBARIUM ABBREVIATIONS

Acronyms of herbaria follow *Index Herbariorum* (<http://sweetgum.nybg.org/science/ih/>).

MO	Missouri Botanical Garden, Saint Louis;
P	Muséum national d'Histoire naturelle, Paris;
TAN	Parc botanique et zoologique de Tsimbazaza, Herbar de Tananarive, Madagascar.

The description of this new species is based on both *in situ* observations and on the herbarium specimens cited, in P and TAN.

Maps used as a background for the distribution map have been downloaded from the following website: <http://www.fao.org/geonetwork/srv/en> (land cover of Madagascar, dated 2009)

The locality coordinates have been done by the authors, using a Garmin etrex 10 GPS with a WGS 84 datum.

For the plant identification terminology, we used Harris & Harris (2000).

Conservation status assessment is given following the IUCN Red List categories and criteria, version 3.1 (IUCN 2012).

TAXONOMIC TREATMENT

Family ORCHIDACEAE Juss.

Sub-family ORCHIDOIDEAE A.A. Eaton

Tribe *Orchideae* (Dressler & Dodson) Verm.

Subtribe *Habenariinae sensu* Ngugi *et al.* 2020

Cynorkis hasinai

Hervouet & Ranaivo, sp. nov.

(Figs 1-6; 8)

DIAGNOSIS. — This species belongs to the group of section *Parviflorae* species with inversed flowers. It differs from all other species by its 5-lobed lip with two very prominent upward 5 mm long intermediate lobes. Four other species in the section have inversed flowers and 5-lobed lip: *Cynorkis quinqueloba* H.Perrier ex Hermans, has intermediate lobes at least half the size of the middle lobe; *Cynorkis quinquepartita* has basal lobes bigger than the intermediate lobes but a little smaller than the middle one; *Cynorkis verrucosa* Bosser has much smaller intermediate lobes and the zone between the two basal lobes is verrucose. *Cynorkis schlechteri* H.Perrier is the closest species, with the intermediate lobes also the most prominent, but it is a much smaller plant (maximum 25 cm versus 42 cm for *C. hasinai* sp. nov.), with smaller flowers, the intermediate lobes being 3 mm long at most, versus 5 mm for *C. hasinai* sp. nov. The lip colour is light pink and white (versus dark red and white for *C. hasinai* sp. nov.). The flowering seasons are different (August-September for *C. schlechteri*, March-April for *C. hasinai* sp. nov.). The altitudes are different (0-800 m for *C. schlechteri* versus around 1200 m for *C. hasinai* sp. nov.).

TYPE MATERIAL. — **Madagascar** • Diana, Montagne d'Ambre National Park, near Sommet d'Ambre; 12°35'S, 49°09'E; alt. 1400-1475 m; 9-13.IV.1993; S. Malcomber, O. Andrianantoanina & J. Rebety 2344; holotype: P[P01800769]! and flowers in alcohol.

ETYMOLOGY. — The species is dedicated to Rakotobe Hasimbola Joelina, known as Hasina. He has been since 2017 our guide, driver

ORCHIDACEAE
Cynorkis sp. nov.



FIG. 1. — *Cynorkis hasinai* Hervouet & Ranaivo, sp. nov., different parts of the plant: **A**, habit; **B**, rachis; **C**, side view of ovary and flower; **D**, front view of flower; **E**, extracted pollen (left), auricles and pollinia (right); **F**, dorsal sepal; **G**, lateral sepal; **H**, petal; **I**, lip; **J**, leaf. Scale bars: A, 2 cm; C, E, 1 mm; B, D, F, G, H, I, 2 mm; J, 1 cm. Drawing by Roger Lala.



FIG. 2. — *Cynorkis hasinai* Hervouet & Ranaivo, sp. nov., plant in its *locus classicus*, Montagne d'Ambre National Park, 29 February 2020. Photograph by Jean-Michel Hervouet.

and dear friend. He is an ardent orchid enthusiast and an outstanding prospector with a very keen eye. We owe him a lot of discoveries and he was able, with his son Landry in February 2020, after extensively scouting the place, to find one plant in flower among many others which were only in bud.

PHENOLOGY. — End February to June.

DISTRIBUTION AND ECOLOGY. — Madagascar. It is so far known only from Montagne d'Ambre National Park in the north of Madagascar (Fig. 7). In the herb layer of humid forests. It has the same habitat and flowering season than *Liparis chantaliae* Hermans & Hervouet (Fig. 8).

CONSERVATION. — This species has been collected from a single locality in Montagne d'Ambre National Park, which suffers, within its limits, from illegal logging and clandestine culture of khat (*Catha edulis* (Vahl) Forssk., Celastraceae), it can be considered Critically endangered (CR) according to criterion B2, with Area of occupation (AOO) less than 10 km², a single location and quality of habitat on decline.

ADDITIONAL SPECIMENS EXAMINED. — Madagascar • Diana, Montagne d'Ambre National Park; VI.2024; *J. Bosser* 20348; P01800748! • Diana, Montagne d'Ambre National Park, near Sommet d'Ambre; 12°35'S, 49°09'E; 9-13.IV.1993; *S. Malcomber*, *O. Andrianan-*

toanina & *J. Rebety* 2344; paratype: MO • Diana, Montagne d'Ambre National Park; 12°37'15"S, 49°10'25"E; alt. 1100 m; 9.IV.2008; *S.M. Trigui*, *M.H. Razanajatovo* & *S.D. Ramandimbimanana* SMT 168; P01768887! • Diana, Montagne d'Ambre National Park; 12°32'02"S, 49°09'52"E; alt. 1198 m; 3.IV.2024; *J. Ranaivo Rjn_Pol_2024-002*, *Aut. Rec. N°72/24/MEDD/SG/DGGE/DAPRNE/SCBE*; TAN! • Diana, Montagne d'Ambre National Park; 12°31'54"S, 49°10'17"E; alt. 1162 m; 4.IV.2024; *J. Ranaivo Rjn_Pol_2024-003*; TAN!

NOTES

The closest species, *Cynorkis schlechteri*, is known in herbaria only from the holotype collected by H.Perrier, close to river Anove on the East coast of Madagascar. It has probably disappeared from this place but a few plants still exist in the Ambodiriana forest near the village of Manompana, around 12 km south of the *locus classicus*. Specimen P01768832 in P, *Nusbaumer L. et al.* LN2375, from Montagne d'Ambre, has been determined *Cynorkis schlechteri* and is indeed also close to *Cynorkis hasinai* sp. nov., but the lateral lobes of the lip do not fit and it has been collected in November. It is in fact *Cynorkis quinquepartita*, this is no wonder since Montagne d'Ambre is its *locus classicus*.

No pollinator of *Cynorkis hasinai* sp. nov. has been observed yet. It seems (Fig. 6) that all flowers are fruiting, which is a hint that the plant could be autogamous or, more probably since the viscidia are functional, facultatively autogamous.

A DNA analysis has been done and will be presented in a further article including other *Cynorkis* species.

DESCRIPTION

Slender terrestrial herb, sometimes also epiphytic on fallen trunks or branches, 17-42 cm tall including the inflorescence. Tubers 1-3, fusiform, elongated, 5 × 1 cm, roots 5-8, up to 6 cm long, wiry, diameter 2-3 mm. Stem and peduncle cylindrical, 2-3 mm in diameter, with a basal enveloping sheath c. 15 mm long, and then up to 8 sheathing acicular scales c. 20 × 2 mm, evenly spaced up to the rachis. Leaves 1-2, basal, sheathing the stem at their base, erect, elliptic to linear-lanceolate, acute or slightly acuminate, 5-26 × 2.3-4 cm, ventrally deep green mottled with light green or white, dorsally light green; one or both margins of the leaf may be thinly undulated, giving a denticulate aspect (Fig. 9). Rachis with 18-30 flowers, 5-7 cm long, cylindrical. Floral bracts linear, acuminate 4-12 mm × 0.8-3 mm. Ovary suberect, not twisted, ridged, 10 × 1 mm, with glandular hairs, light green. Flowers very small, from top to bottom 11 mm, 9 mm wide, secund, spreading; dorsal sepal cucullate, concave, almost navicular, obtuse, 3 × 2.2 mm, white slightly tinged with pink; lateral sepals ovate, almost navicular, falcate, obtuse, 3 × 2.2 mm, concave at the apex, 3-nerved, strongly reflexed, dorsally with glandular hairs, white; petals elliptic, 3 × 1.7 mm, falcate, 3-nerved, also with a few glandular hairs, white with apex tinged with pink and a few purple marks; lip 5-lobed, 5-6.6 × 3-8 mm, erect, dorsally white, ventrally with white gorge and all lobes with wine-coloured streaks and points, basal lobes short, 1-2 mm, sub-rectangular, intermediate lobes 3-4.6 mm long, spatulate, 0.6-1.5 mm wide, progressively widened, at c. 45° from vertical axis, midlobe triangular, 2 × 1.2 mm,



FIG. 3. — *Cynorkis hasinai* Hervouet & Ranaivo, sp. nov., rachis, Montagne d'Ambre National Park, 4 April 2024. Photograph by Jean-Michel Hervouet.

acute, with 3 parallel nerves; spur parallel to the ovary, above it, broadening from base to apex, laterally flattened (1 mm high $\times$ 0.5 mm wide), ampullaceous at the apex, 3–4 $\times$ 0.6 mm, translucent. Column 1–2 $\times$ 0.7–0.8 mm, anther obtuse; rostellum slightly trilobed, saddle-shaped, the three lobes subequal, middle lobe bifid. Caudicles and viscidia lying in the grooves formed between the rostellum lobes. Auricles on either side of pollinia, triangular in front view.

DISCUSSION

It is amazing that this new species has been discovered in a national park which has been extensively searched and visited by famous botanists in the 20th century, such as Henri Perrier de la Bâthie and Jean Bosser. The latter had collected it in 1970, but he never described it. As a matter of fact, it was only when *Cynorkis schlechteri* was rediscovered close to its *locus classicus* on the east coast of Madagascar and a photograph (Fig. 9) published (Hervouet 2018: 310) that the two plants could be clearly distinguished.

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FIG. 4. — *Cynorkis hasinai* Hervouet & Ranaivo, sp. nov., front view of lip, Montagne d'Ambre National Park, 29 February 2020. Photograph by Jean-Michel Hervouet. Scale bar: 5 mm.



FIG. 5. — *Cynorkis hasinai* Hervouet & Ranaivo, sp. nov., side view of ovary and flower, Montagne d'Ambre National Park, 29 February 2020. Photograph by Jean-Michel Hervouet. Scale bar: 5 mm.



FIG. 6. — *Cynorkis hasinai* Hervouet & Ranaivo, sp. nov., plant epiphyte on rotting log, with swollen ovaries, Montagne d'Ambre National Park, 4 April 2024. Photograph by Jean-Michel Hervouet.



FIG. 7. — Distribution map of *Cynorkis hasinai* Hervouet & Ranaivo, sp. nov.



FIG. 8. — *Liparis chantaliae* Hermans & Hervouet, side by side with *Cynorkis hasinai* Hervouet & Ranaivo, sp. nov. Montagne d'Ambre National Park, 4 April 2024. Photograph by Jean-Michel Hervouet.



FIG. 9. — *Cynorkis hasinai* Hervouet & Ranaivo, sp. nov., leaf with both margins denticulated, Montagne d'Ambre National Park, 4 April 2024. Photograph by Jean-Michel Hervouet.



FIG. 10. — *Cynorkis schlechteri* H.Perrier in the Ambodiriana forest along the east coast of Madagascar. Photograph by Jean-Michel Hervouet. Scale bar: 5 mm.

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