

**Two new *Pinguicula* species
(Lentibulariaceae; *P. benedicta*-group) from the eastern mountain
range of Cuba (Greater Antilles) with reddish flowers**

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Summary: In the most eastern mountain ranges of Cuba two new *Pinguicula* species could be detected. One of them – *Pinguicula bissei* Casper spec. nova, collected by Dr. Kurt Zoglauer (Berlin) – could be cultivated in the Botanical Garden of the University of Jena and has reddish to white flowers. The second – *Pinguicula caryophyllacea* Casper spec. nova – is only documented by voucher specimens and photographs from the type locality; it is flowering pink to deep red. Both species are similar to *P. benedicta* Barnhart.

Zusammenfassung: In den östlichsten Bergketten Cubas konnten wiederum zwei neue *Pinguicula*-Arten entdeckt werden. Eine von ihnen – *Pinguicula bissei* Casper spec. nova – wurde von Dr. Kurt Zoglauer (Berlin) gesammelt und erfolgreich im Botanischen Garten der Universität Jena kultiviert. Sie blüht rötlich bis weiß. Die zweite – *Pinguicula caryophyllacea* Casper spec. nova – ist nur durch Herbarbelege und Fotos vom Typusstandort bekannt. Sie blüht rosarot. Beide Arten ähneln *P. benedicta* Barnhart.

Keywords: *Pinguicula bissei* Casper spec. nova, *Pinguicula caryophyllacea* Casper spec. nova, *Pinguicula*, *Pinguicula benedicta*-group, Lentibulariaceae, east Cuba (Oriente), Greater Antilles.

The mountain range of the eastern part of Cuba is said to be the region with the greatest number and variety of species of the island. But because of the difficulties to set out on a journey into this region its flora and vegetation is not adequately known. Every year species new to science are described. They are the living proof for the allegation that eastern Cuba is still to a certain degree “terra incognita for Botany” as Hooker once wrote (HOWARD 1988).

The present contribution results again from the revision of the Lentibulariaceae for the “Flora de la República de Cuba” in the scope of the “Proyecto de la Flora Cuba” (PFC). But expeditions of Jorge Gutiérrez (La Habana), Ralph Mangelsdorff (Frankfurt/Main), Kurt Zoglauer (Berlin), Monika Löschner (Berlin), and Egon Köhler (Berlin) recently made in 2002 and 2003 led to additions to the hitherto collected specimens and to the finding of new specimens. The better equipment with cameras and films allowed a nearly adequate interpretation of the flower colours (especially with respect to *Pinguicula benedicta* Barnhart with its flowers said to be dark-blue).

Usually, herbarium specimens do not allow a doubtless classifying of the flower colour. According to the mode of preparation and the process of dying, the colour conceptions are often too wide, too variable and too indefinite. But these reservations do not match the original description by SHAFER (1910: 218). Finding his new *Pinguicula* near Camp San Benito he writes about “a beautiful blue-flowered *Pinguicula*” which “occurred along the stream”. That is absolutely certain because he had fresh material on his hands. When BARNHART (1920: 110) ten years later described *P. benedicta* based on Shafer’s gatherings the process of dying of the

original material must have led to changes in the original colour which became faded. This may be the reason why ERNST (1961: 167) put the corolla colour in quotation marks (“dunkelblau”): the original colour could not be detected.¹

With respect to the PFC-collections in La Habana (HAJB), Jena (JE) and Berlin (B) it has to be spelled out: nearly all of the information about *Pinguicula*-populations not flowering whitish or yellowish from eastern Cuba are focused on *P. benedicta* Barnhart which is said to be a small pretty plant with distinctly blue to dark blue flowers (SHAFFER 1910; BARNHART 1920; ALAIN 1957; ERNST 1961). The type voucher of *P. benedicta* has been destroyed during World War II at Berlin.

Nobody of the “modern” plant hunters had another source than the poor notes in the relevant floristic literature. They qualified the specimens collected (on the labels, in their diaries) as flowering red, violet or lilac, but never (!) pure blue. Only Hagen Stenzel (Berlin) has observed and photographed a nearly pure bright blue specimen dwelling together with one white flowering. In my paper on *P. benedicta* Barnhart planned for the end of the year 2004 I will discuss the Stenzel-finding in detail.

During the numerous excursions undertaken by Cuban and German botanists in the years between 1966 and 2003 into Oriente, a lot of *Pinguicula* specimens have been collected and photographs were taken. But the results as a whole are disappointing.² Only in the recent years new species could be described – *P. jaraguana* Casper (whitish flowering; CASPER 2003) and *P. infundibuliformis* Casper (with reddish flowers; CASPER 2003). Detailed studies of the former collections and of the accompanying collector’s notes together with new findings will put out new *Pinguicula* taxa in future.

Results

***Pinguicula bissei*³ Casper, sp. nova**

Pl. 1–4; Fig. 1 (map)

Holotypus: [sub *Pinguicula benedicta*], Cuba, Guantánamo, Alturas de Baracoa, Camarones, Orillas de Río Báez, entre Camarones y Mina Amores; alt. 155 m; coord.: NB. 20°25’551”, WL. 74°37’320”; 08.03.2002; leg. J. Gutiérrez, E. Köhler & K. Zoglauer; det.: E. Köhler – P.F.C. 799693 – HAJB (not seen; Isotype: JE).

Diagnosis: Herba perennis, rosulata. Lamina foliorum circuitu oblonga to suborbiculata, ~10(–12)×8mm longa, margine non involuta plana solum adpressa; flores parvi vel mediocres, ~15–20mm longi (calcaribus incluso); corolla pallide rubra vel albescens, lobis oblongis inter se non tegentibus; scapi 1(–2) erecti, ~10–12(maturitate up to ~18)cm alti, teretes.

Distributio: Cuba orientalis, provincia Guantánamo, endemica (Fig. 1, map).

Habitatio: In scopulis permanente humidis, ~150m supra mare (1A–B).

¹ Working in his monograph on *P. benedicta*, CASPER (1966) could only follow the description of ERNST (1961) adding some notes taken from a sheet of CLEMENT (1944, nr. 3610 – MT).

² The situation with respect to western Cuba is somewhat better. But nevertheless in *Pinguicula* only one new species – *P. cubensis* Urquiola et Casper – could be described (CASPER & URQUIOLA 2003).

³ The epithet has been chosen in honour of Prof. Dr. Hannes Bisse, who initiated the German-Cuban cooperation to study the flora of Cuba in 1966.

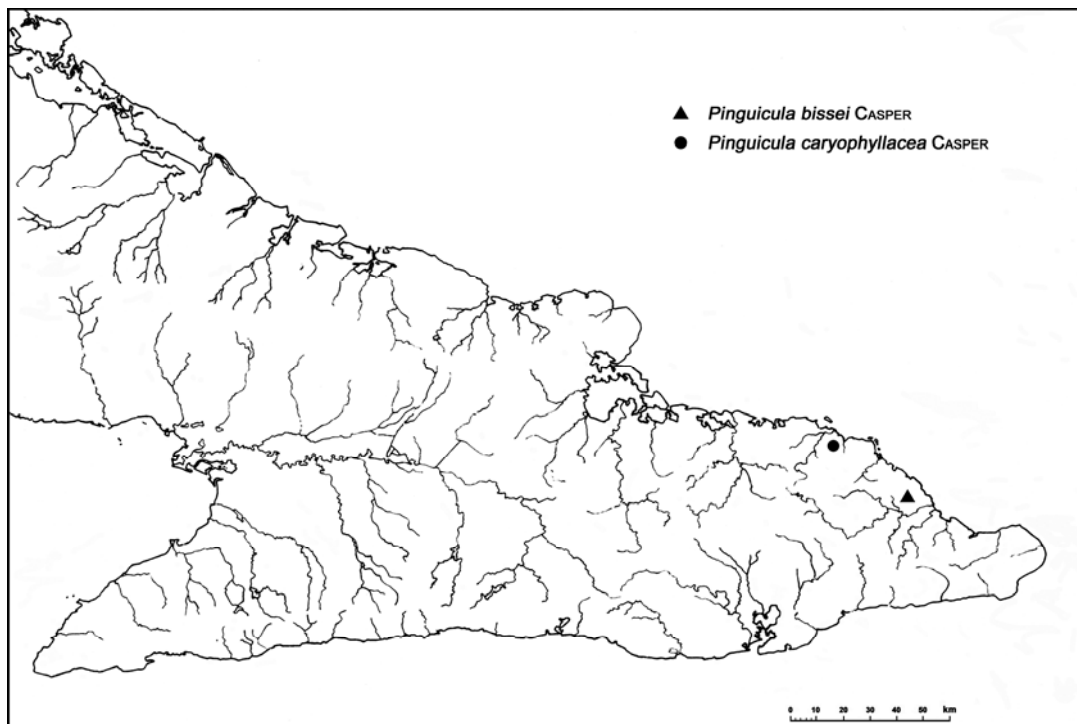
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Figure 1: Localities of the types of *Pinguicula bissei* and *Pinguicula caryophyllacea*.

Description: Perennial rosulate herbs (1C–E), in flower up to 12cm, in fruit up to 18cm tall. Rhizome short, with many relatively strong roots. Leaves 4–8(~10), rosulate, simple, yellowish green, in outline suborbiculate to obovate (1C–E), ~8(~12)×8mm, base shortly attenuate, margin entire, slightly revolute, upper surface densely covered with sessile and stalked glandular hairs. Scapes 1(2), ~8–12(18)cm tall (2D), ~½mm in diameter (3), one flowered, covered with sessile and stalked glandular hairs, in flower and fruit nearly up straight. Flowers two-lipped (2D,3B; with a subisolate tendency when adult), ~15–20mm long (spur included), wide open, lobes bent outwards (2B,C,F), corolla pale red to white, tube red (2E) to (in the white flowering individuals) whitish-yellowish-greenish, spur red to (in the white flowering individuals) greenish to white. Calyx two-lipped (3A,C), greenish, reddish to purple, sparsely covered with glandular hairs; the upper-lip deeply tri-lobed, lobes oblong apex rounded (3A), the lower-lip up to ~¼ of its length two-lobed, the lobes oblong not spreading (3B). Corolla pale red to white (2B,C,E), the lobes nearly equal (the middle lobe of the lower lip always longer than the other lobes), oblong, rounded at the apex, spreading, not covering themselves, in the region of the throat with multicellular uniseriate hairs without distinct head cells; tube subcylindric to funnel-shaped, without palate; at the throat, on the bottom in the tube and in the spur particular zones beset with characteristic patterns of white hairs of different shape and size (4D–I); ~5–6mm long, adult as long as the corolla lobes; spur green, red or white, continuing the tube, forming an angle of ~20–140° with the tube, ~5–7mm long, over its whole length equal wide, at the apex blunt, rounded; sometimes (especially in the white flowering individuals) with a coloured (red, green, yellowish, white) ring in its lower part above the apex. Fruits globular, small, no longer than the persistent calyx lobes (4C). Seeds not seen.

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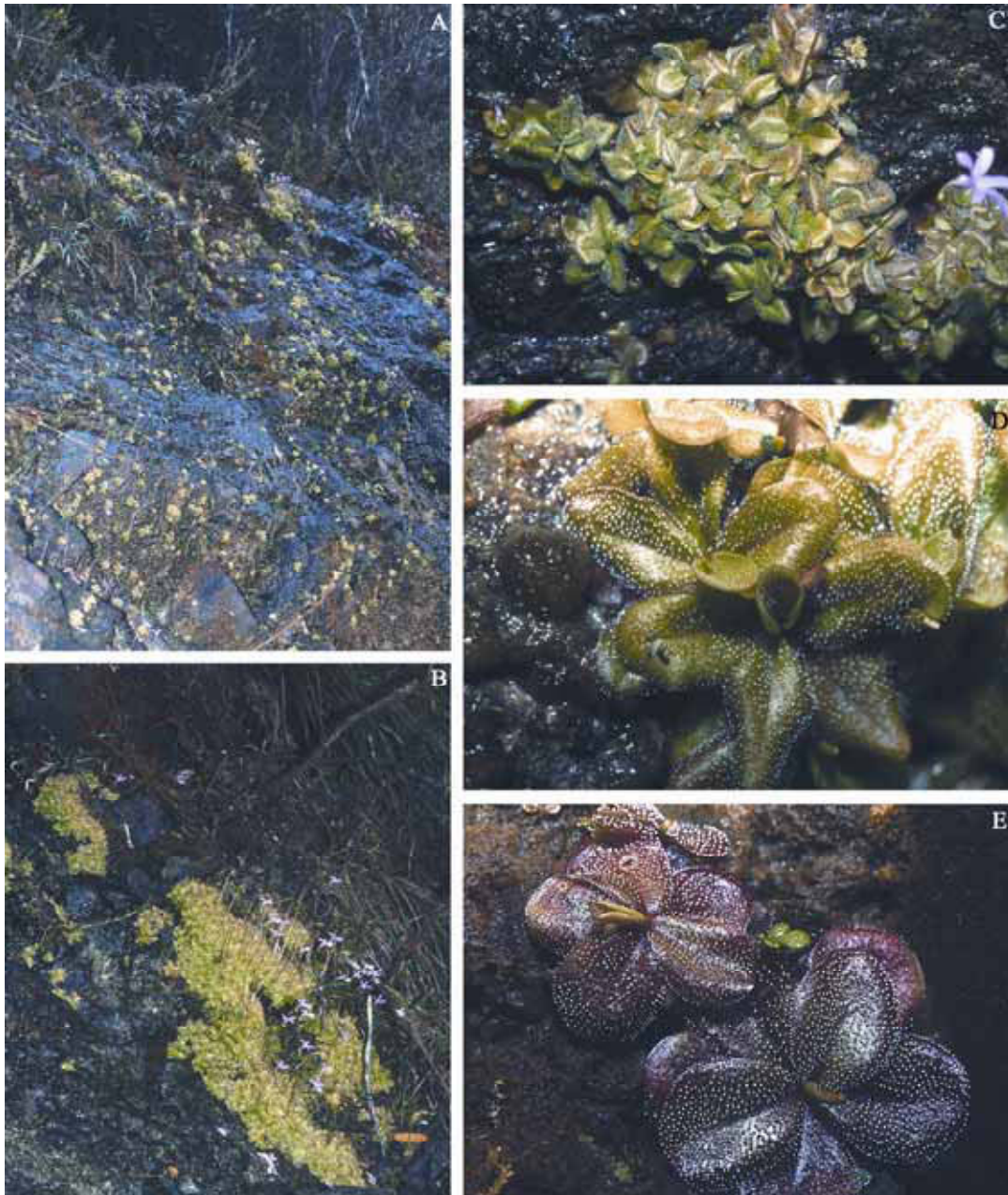


Plate 1: *Pinguicula bissei*. A) Locality of the type specimens sloping down to the river (~1:25). B) Part of the population with numerous flowering individuals (~1:10). C) Group of rosettes with shining leaf surfaces and noticeable middle nerves (~0.5:1). D) Detail of C showing the densely glandular hairs and the slightly revolute leaf margins (~1.8:1). E) Purple leaves apparently growing in the blazing sunshine (~1.6:1). – Original photographs by R. Mangelsdorff; preparation by Rosemarie Stimper.

Plate 2 (see following page): *Pinguicula bissei*. A) Group of plantlets with white and pale red flowers; note the white open corollas (1:4). B) Flower in front view, showing the oblong spreading not covering corolla lobes, the sparsely haired and inconspicuous pattern of darker nerves at the entrance into the throat (~3:1). C) Like B showing part of spur (~3:1). D) Like A showing the characteristic insertion of the flowers on the tip of the shape and the light slightly bent down spurs (~1:3). E) Flower in side view with their typical wide open corolla (here nearly 180°), the short

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cylindrical-funnel-shaped veined tube and the thin, over its whole length equally wide spur forming an angle of nearly 90° with the tube. In this individual the colour of the spur is that of the flower at all. The calyx is purple-coloured (~2:1). F) White flower in front view; it is densely white haired at the base of the corolla lobes of the lower-lip and in the throat. In the background of the tube the whitish stigma is discernable (~3:1). – Original photographs by R. Mangelsdorf, preparation by Rosemarie Stimper.

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Isotypus JE

Herbarium Haussknecht Jena

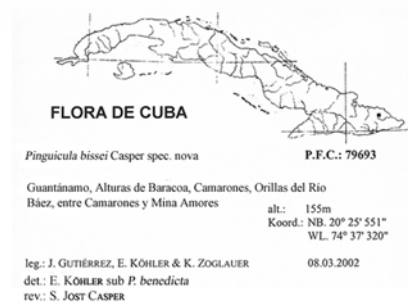


Plate 3: *Pinguicula bissei*. Photocopy of the isotype deposited in JE (~1:1.5). – Photograph: Rosemarie Stimper.

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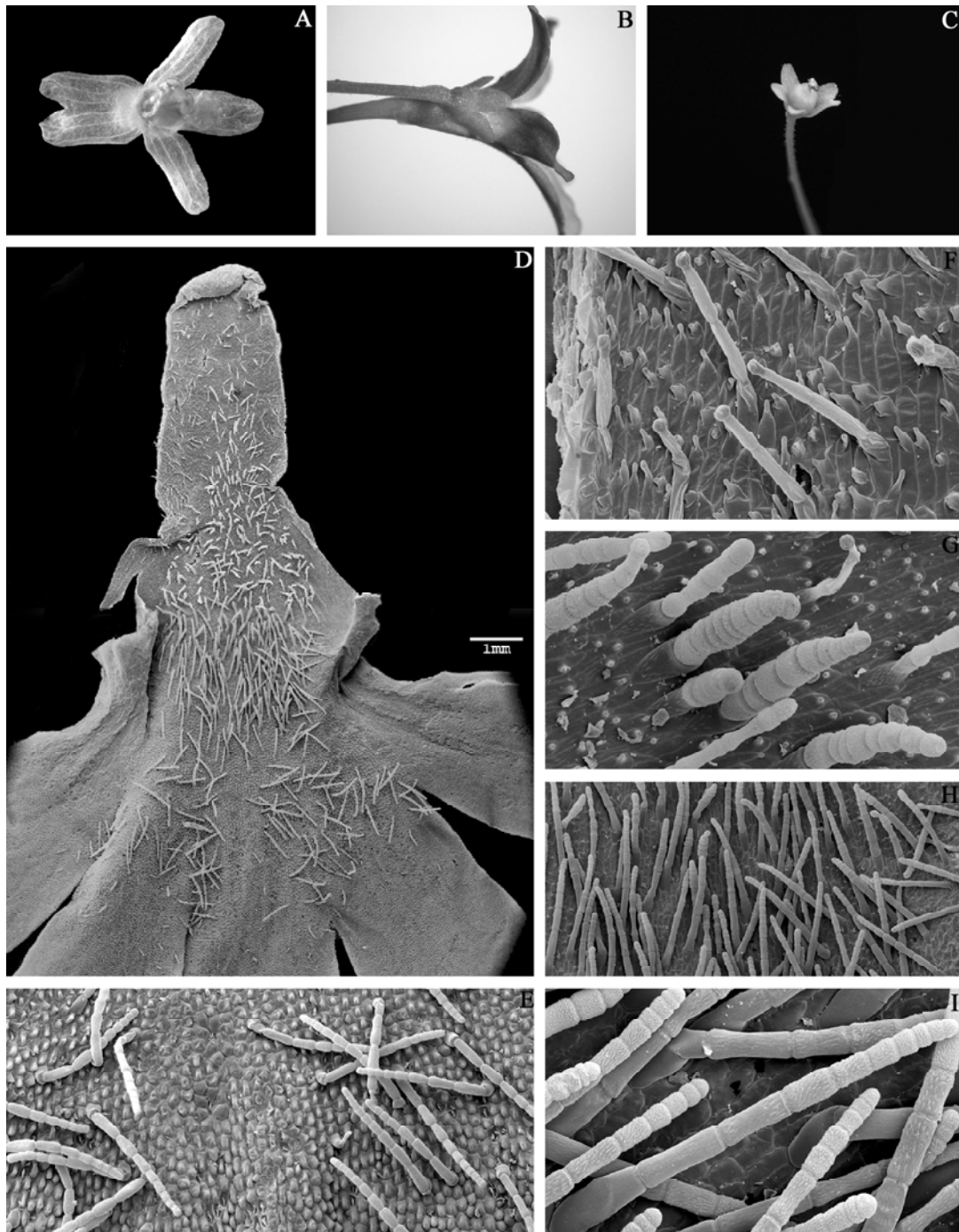


Plate 4: *Pinguicula bissei*. A) Calyx, inside, fixed in alcohol 70% (~3.5:1). B) Flower in side view, fixed in alcohol 70%, showing the calyx (~2:1). C) Capsule (not ripe) enclosed of the calyx; living material (~1.5:1). D) Corolla opened, inside view, showing the different hair zones, freezing-point drying for SEM-study; from top to bottom of the picture: spur, tube, throat and base of corolla lobes. E) Multicellular uniseriate slender headless hairs in the basal zone of the corolla lobes. F) Stalked glandular hairs and papillate epithelial cells in the spur. G) Multicellular uniseriate compact headless hairs in the tube. H–I) Multicellular uniseriate slender headless hairs in the throat. – A–C Preparation and photographs Rosemarie Stimper. D–I SEM-preparation and photography by Ingeborg Herrmann.

Note: The locality of the type specimens is situated near the springs of Río Báez, a short rivulet (about 12km long) coming from the hills ~2km west of the village Camarones and flowing into the Bahía Báez (Océano Atlántico) ~3km NE of the village Báez (Fig.1, map).

Colour photographs from the original locality and from cultivated material were taken by Ralf Mangelsdorff (Frankfurt/Main), Dr. Kurt Zoglauer (Berlin) and prepared by Rosemarie Stimper (Jena). Photocopies (also additional, in this paper not presented ones) are deposited in the photothek of JE.

***Pinguicula caryophyllacea* Casper, sp. nova**

Pl. 5–7; Fig. 1(map)

Holotypus: Cuba, Holguin, Moa. Orillas del Río Limones⁴, 400m, pluvisilva, laterita; 20.04.1982; leg. H. Bisse, M.L. Diaz, H. Dietrich, L. Lepper, B. Mory y V.C. Sánchez. Det.: S.J. Casper 2002 (inedit.) – P.F.C. 44580 – JE (7; no vouchers seem to exist in HAJB and B).

Diagnosis: Herba perennis, rosulata; rosula ~15–25mm in diametro. Lamina foliorum circuitu ovata apex acuta, margine involuta, ~10–15×8–10mm longa succulenta solum adpressa; flores parvi, ~15–20mm longi (calcaribus inclusis), caryophyllaceae; corollae lobis labii inferi obovatis marginibus inter se tegentibus; scapus 1, erectus, ~10–15cm altus, teres.

Distributio: Cuba orientalis, provincia Holguin, endemica (Fig. 1, map).

Habitatio: In locis collibus humidis, ~400m supra mare (5A).

Description: Perennial rosulate herb, in flower up to ~7–8(–10)cm tall. Rhizome short, with many adventitious delicate transitory roots. Rosettes not erect, ~15–20mm in diameter, leaves fleshy, ~4–7(–10), simple, green to reddish-green, ~10–15×8–10mm, to the base shortly attenuate, in outline ovate-acute with entire margins more or less involute upper surface densely covered with sessile and stipitate glandular hairs (5B–C). Scape 1, slightly curved, up to 100mm tall, ~1mm in diameter, one-flowered (5A,7), sparsely covered with sessile and stipitate glandular hairs especially below the calyx. Flower two-lipped (5D–G), ~12–15–20(–25)mm long (spur included) nearly totally pure “pink”-coloured (“caryophyllaceus”; 5A–G). Calyx two-lipped (6B,C), pink, somewhat darker than the rest of the flower (5D), covered with glandular hairs; the three sepals of the upper-lip divided to nearly their bases, oblong, apex often truncate to slightly incised, the lateral ones longer and broader than the middle lobe, ~2.5–3.5mm long; the two sepals of the lower-lip often only slightly retuse or truncate (form and structure of the calyx seem to be very variable; see “observations”), ~2.5–3.5mm long. Corolla two-lipped (5D), ~25×20mm; the two lobes of the upper-lip oblong, apex rounded, ~6–7mm long, much smaller than the lobes of the lower-lip, spreading to an angle of 45°, not covering themselves, bent upwards to ~90°, with single white hairs at the bases; lower-lip ~12–20mm broad, the three lobes sometimes very different in size and shape and then the lateral ones oblong to slightly obovate, much shorter than the middle lobe, sometimes nearly as long and broad as the middle lobe and then broadly obovate; the middle lobe mostly broadly-obovate, ~8–12mm long and broad; at the bases with single white hairs; the three lobes at every case covering themselves with their margins; tube funnel-shaped, ~6–7mm long, without palate, but at its entrance into the throat with two very small (dull) white hairy

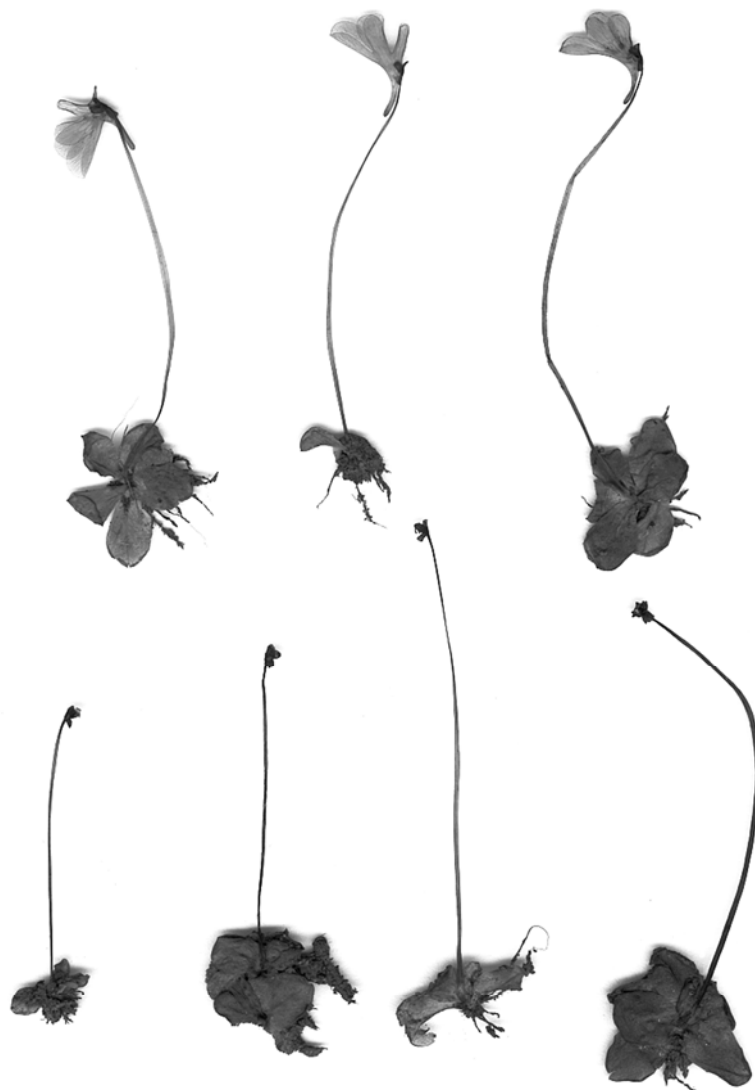
⁴ Río Limones: eastern spring rivulet of Río Jaguani; I couldn't find it on the available maps. During April the camp of the expedition of 1982 was situated above La Breña south of Moa.

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Plate 5: *Pinguicula caryophyllacea*. A) Small population (~1:4). B) Detail, showing the pink flowers and the small rosettes with their shining fleshy leaves in outline ovate-acute with involute margins (~1:4.5). C) Like B showing the characteristic leaf rosettes and the nearly pure pink flowers (calyx included) with the corolla lobes of the lower-lip covering themselves. D) Flower in sloping side view, photographed from above, showing the great extent of corolla lobes, the relatively well developed tube, the red calyx and the red, at the apex obtuse spur bent downwards forming an angle of nearly 90° with the tube (~3.5:1). E) Flower in front view, typical two-lipped, nearly as long as wide, with two smaller spreading upper-lip lobes and three lower-lip lobes covering themselves, at the throat with white hairs, the middle lobe greater than the lateral ones (~4:1). F) Like E, but the whole flower longer than wide, the middle lobe of the corolla lower-lip extremely accentuated, much longer and wider than the lateral ones (~4:1). G) like E and F, but the lateral corolla lobes of the lower-lip nearly as long as the middle lobe; note the small size of the leaf rosettes compared with the corolla (~3.5:1).

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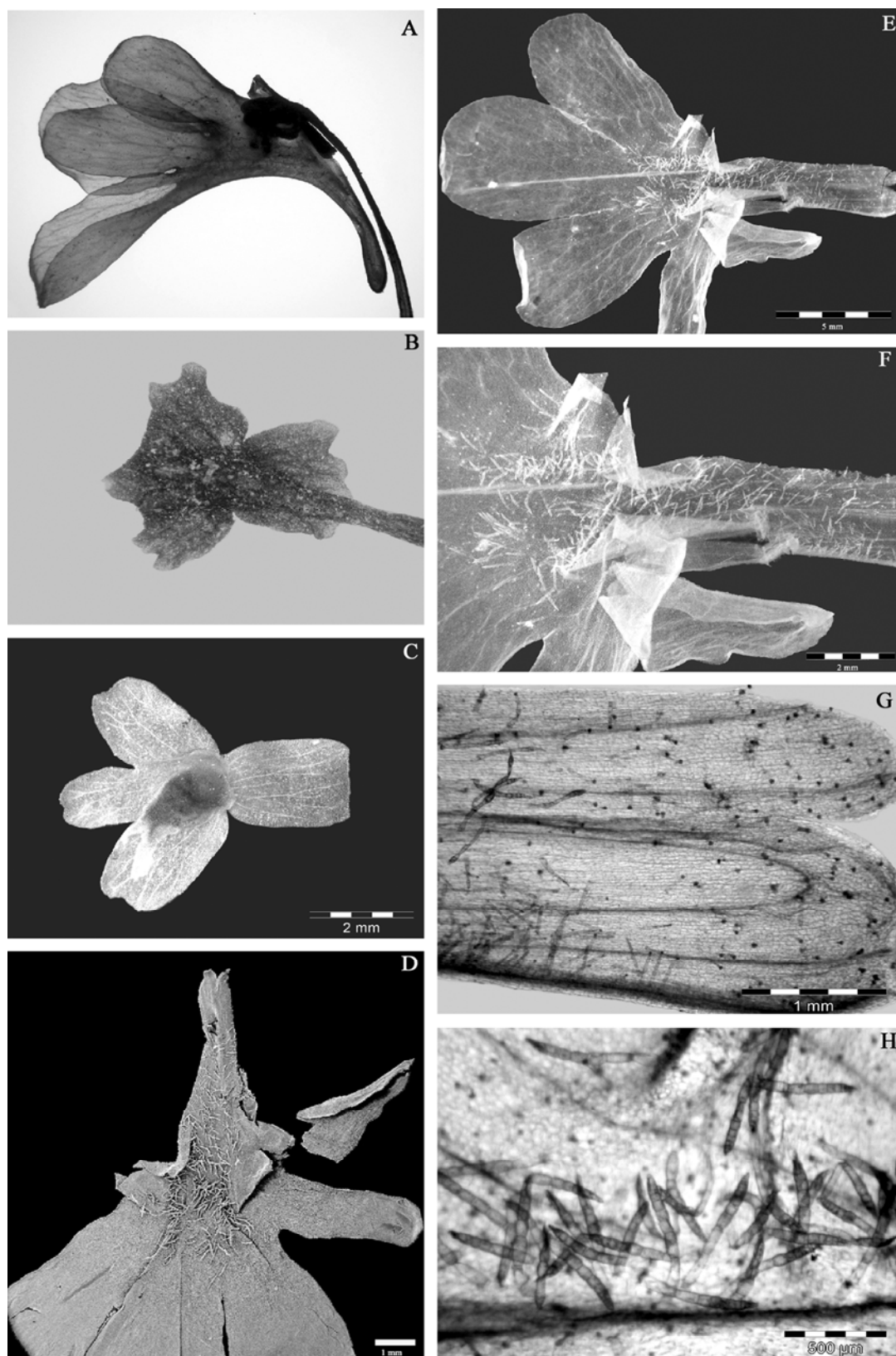
Holotypus JE

HERBARIUM HAUSSKNECHT JENA
FLORA DE CUBA P.F.C.: 44580
Pinguicula caryophyllacea Casper spec. nova
 Holguin, Moa: Orillas del Rio Limones
 400 m, Pluvisilva, laterita
 leg.: Bisse, Diaz, Dietrich, Lepper, Mory y Sánchez - 20.04.81
 det.: S.J. Casper 2002

Plate 6: *Pinguicula caryophyllacea*. Photocopy of the holotype deposited in JE (~1:9).

Plate 7 (see following page): *Pinguicula caryophyllacea*. A) Flower in side view, dried; showing the accentuated corolla lower-lip middle lobe and the spur forming an ~obtuse angle with the tube (~4:1). B) Calyx, dried, with irregular formed lobes (~5:1). C) More or less "normal" calyx (fixed in alcohol 70%) with the broad lateral lobes of the upper-lip and the not divided lower-lip. D) Corolla prepared for SEM-study, showing the hair zones; apical zone of the spur and the corolla lobes nearly hairless. E) Corolla fixed in alcohol 70%, showing the slender (not compact) multicellular uniseriate hairs without distinct heads. F) Detail of E. G) Apical end of the spur without hairs but with single sessile and stalked glandular hairs. In front of this section slender multicellular uniseriate hairs. H) Multicellular uniseriate hairs with a single acute apical cell in the tube zone.

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spots; in its middle section with shorter white multicellular uniseriate hairs with a single acute head cell; spur thin (~1mm in diameter) forming an angle of between 70–90° with the corolla (6G), apex obtuse rounded. Capsule orbiculate (in culture not fully developed), the scapes during this period up straight. Seeds not seen.

Observations: The calyx of the flower is very variable in its shape. “Normal” developed calyces with typical three-lobed upper-lips can be observed. The lobes themselves are regular formed, i.e. they are deeply divided, oblong and at the apex rounded or retuse. The small amount of material available showed surprisingly that the lateral lobes were greater than the middle lobe (6B–C). The lobes of the lower-lip were not typically divided; often they were connate, i.e. they appeared as one lobe with a truncate apex. Totally aberrant calyces were also found: the apices of the lobes of the upper- and lower-lip were several times irregularly divided. The divisions were relatively short (up to 3/8 of the length of the lobes).

Note: The low plantlet was first seen on April 20, 1981, during the expedition directed by Hannes Bisse into the mountain region south of Moa. In her diary (1981, p. 11), Helga Dietrich noted: “... am Rio Limones sammelten wir in kürzester Zeit viele Sammelnummern ... und fotografierten viel. Besonders schön war gleich am Anfang eine reiche Kolonie von *Pinguicula benedicta* s.l. in voller Blüte (rosarot) ... ” [... at Rio Limones we gathered many specimens in a very short time ... and took many photographs. Especially beautiful was at the start a colony of many individuals of *Pinguicula benedicta* s.l. full in flower (pink-coloured) ...].

Photocopies of the whole material are deposited in the photothek of JE.

Acknowledgements

Living material of *Pinguicula bissei* was made available to me by Dr. Kurt Zoglauer (Berlin) and Ralph Mangelsdorff (Frankfurt/Main), who also made many colour photographs and gave important information to me. The black-and-white photographs mentioned above were taken at the original localities by Dr. Lothar Lepper (Jena) or from plantlets of these sources which were cultivated in BGJ. They were cultivated and prepared for our studies by Rosemarie Stimper (Jena). For microscopical and SEM-studies Rosemarie Stimper and Ingeborg Herrmann (Friedrich-Schiller-Universität Jena, Elektronenmikroskopisches Zentrum der Medizinischen Fakultät) prepared the material and took the photographs. To all persons I am very indebted.

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