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Pinguicula mariae Casper nova spec. and *Pinguicula apuana* Casper et Ansaldi nova spec. – A contribution to the occurrence of the genus *Pinguicula* L. (Lentibulariaceae) in the Apuan Alps (Italy)

Maria Ansaldi & S. Jost Casper

Summary: We present a description of two new *Pinguicula* species endemic to the Apuan Alps (Italy). *P. mariae* Casper (*P. reichenbachiana* auct. p.p.) is more or less related to *P. poldinii* Steiger et Casper from Friuli-Venezia Giulia and to *P. reichenbachiana* J. Schindl. from the Maritime Alps; the three taxa are tetraploid (2n = 32), the two first belonging to ser. *Prealpicae* Casper. *P. apuana* Casper et Ansaldi is related to *P. vulgaris* L. s.l. from which it is distinguished mostly by quantitative and geoecological features and it belongs to a group of allopatric 'Kleinarten' (distributed as a chain of vicarious taxa) on octoploid chromosome level (2n = 64) throughout the Apennine mountain range from the Ligurian Alps to the Abruzzo mountains. A comparison of the new species with similar (related) taxa is drawn.

Keywords: *Pinguicula,* Lentibulariaceae, taxonomy, new species, *Pinguicula mariae, Pinguicula apuana*, Apuan Alps, flora of Italy, determination key, description

About fifty years ago, at the beginning of June 1957, Casper had the chance to go to southeastern France and northern Italy for some days and to visit the *Pinguicula* sites in the Maritime Alps (Roya Valley) and in the Apuan Alps (surroundings of Forno, Sorgenti del Frigido, and Stazzema, M^{ti} Nona-Procinto)[1]. Unfortunately he caught a cold and had to stay in the albergo of Stazzema for some days. After all he had to leave the area for Austria to cure himself. Therefore, he got only a glance at the *Pinguicula* populations. Nevertheless, he was convinced that the populations of M^{ti} Nona-Procinto and of Sorgenti del Frigido would be conspecific with *Pinguicula reichenbachiana* J. Schindl. (Casper 1959). He believed that the populations in question should be classified as a subspecies of *P. longifolia* Ramond ex DC. (Casper 1962: 71). Moreover, he suspected that the populations reported by Italian botanists from the Apennines and Abruzzo mountain range would belong to the Schindler taxon, too (Casper 1959: 280, 1962: 71, 1966: 154).

At first, Casper doubted the correctness of his own taxonomic decisions (including his position against *P. leptoceras* Rchb. and *P. vulgaris* L. in central Italy) when learning about the existence of *Pinguicula fiorii* described by Tammaro & Pace (1987) from Cannelluccia di Bocca (Abruzzo). The taxon didn't really fit into the scope of *P. longifolia-reichenbachiana*. However, the chromosome number reported (tetraploid; 2n = 32) seemed to agree with the corresponding findings in *P. reichenbachiana* (Casper & Stimper 2009).

When visiting the senior author at Jena ten years ago, Jan Schlauer (Frankfurt / Main) drew his attention to the fact that the geomorphological and geological situation in the Apuan Alps and the

1) He was encouraged by his late friend Hans Metlesics from Vienna, an outstanding amateur botanist who brought together an excellent herbarium of European plants nowadays deposited in Linz, Austria; LI-(MET). He had gathered *Pinguicula* cf. *reichenbachiana* at the M^{ti} Nona-Procinto site (see Casper 1959).

neighbouring parts of the northern Apennines is quite different. After searching for *Pinguicula* in these areas together with Jürg Steiger (Bern-Kreuzberg), he ascertained that the population near Forno couldn't belong to the M^ti^ Nona-Procinto population of *P. reichenbachiana*. He thought it to be related to *P. vulgaris* like the populations they had detected in the northern Apennines.

Now, the senior author believes that it would be necessary to correct his former, apparently faulty taxonomic statements, and he decided to study again the whole complex by using his annotations of 1957. He examined the vouchers newly – the authorities of the herbaria BOLO, FI, and PI made them available to him – and started some excursions into the Apuan Alps and the neighbouring parts of the Apennines mountain range. Most time he was accompanied and greatly helped by Maria Ansaldi, an outstanding expert in flora and vegetation of the area and of the region in question at all. Our study presented here is the result of our common efforts.

Historical background

The Apuan Alps are forming a comparably isolated mountain massif neighboured to but distinctly separated from the Tuscan Apennines. The small mountain range with its main axis being oriented NW-SE – about 55 km long and about 25 km broad with its highest peak M^te^ Pisanino (1946 m) – is distinguished by its specific climatic conditions and geological history: for instance, its average precipitation is higher than in Friuli-Venezia-Giulia mountains, its geology is very complex. The variable climate and geomorphology characterise flora and vegetation (Garbari 1989: 34; Garbari & Bedini 2006: 149).

The flora of the Apuan Alps is said to be rich in palaeo- and neoendemic species. Boreoalpine or arctoalpine floral elements as well as E-Balkan ones come together (Di Fazio et al. 2004; Garbari & Bechi 1992; Garbari & Bedini 2006). During our study on *Pinguicula* we noticed an increase of the number of endemic taxa in the area.

Antonio Bertoloni (1775–1869)[2] reported for the first time in detail about the plant life of the Apuan mountain range in his *Flora Alpium Apuanarum* (*Amoenitates Italicae* …1819: 325 ff.). He only knew *Pinguicula grandiflora* Vahl or Willdenow, respectively (which he believed to be identical with *P. grandiflora* Lam.) from the region and distinguished it clearly from *P. vulgaris* L. His plant collections were deposited at the Institute of Botany at the University of Bologna (BOLO). As a consequence of the Second World War, the herbarium has suffered damage and losses (Cristofolini et al. 1987: 405). Nevertheless, the collections preserved are of great importance for the interpretation of the corresponding phrases in Bertoloni's works, not only in his *Amoenitates Italicae* … (1819) but also in his *Mantissa* (1832) and *Flora Italica* (1834).

In 2006, when studying *Pinguicula* in *Erbario Bertoloni* (BOLO), we found, well deposited, nearly all of the taxa reported by Bertoloni. His handwritten labels shed light on his views about the nature of taxa as well as on the localities that he and his son Giuseppe (Josephus) had visited.

The most recent comprehensive report on *Pinguicula* in the Apuan Alps is from Pichi-Sermolli (in Ferrarini et al. 1997: 242–243). From his point of view, *P. leptoceras* Rchb. and *P. longifolia* Ramond ex DC. subsp. *reichenbachiana* (J. Schindl.) Casper are the only two *Pinguicula* taxa

2) Antonio Bertoloni was born at Sarzana (Liguria), a little town ~ 8 km E from La Spezia (SP-Liguria) and ~ 10 km NW from Carrara (Tuscany). His *Rariorum Liguriae Plantarum* (1803–1810) and his *Flora Alpium Apuanarum* (1819) reflect well his excellent knowledge of and his solidarity with his native country.

occurring in the mountain range. He founded his information on the studies made by Casper (1962, 1966) which, as we will show, no longer can be thought to be correct. Neither *P. leptoceras* nor *P. longifolia* subsp. *reichenbachiana* are inhabitants of the Apuan Alps. In reality, their place is taken by *P. apuana* and *P. mariae*.

I. *Pinguicula mariae*[3] Casper nova spec. (Figs 1–2, Plates 1–4)

Type: Italien. Apuanische Alpen, Torrite, Isola Santa, ~ 350 m, Felsen, Straßenrand, leg. 27.04.2004, J. & Rosmarie Casper, W. Spanowsky, E. Hübl, Maria Ansaldi – JE, fol. I–III [cult. BGJ 74.1] (Holotype) – Fig. 1 (fol. I).

Synonyms (selected):

= *Pinguicula reichenbachiana* J. Schindl. p.p. (specimina Alpium Maritimarum et Montium Aprutiarum excludenda), Casper, Repert. Spec. Nov. Regni Veg. 61(1): 274–280 (1959).

= *Pinguicula longifolia* subsp. *reichenbachiana* (J. Schindl.) sensu Casper p.p. (specimina Alpium Maritimarum et Montium Aprutiarum excludenda), Repert. Spec. Nov. Regni Veg. 66(1/2): 71 (1962); Biblioth. Bot. 127/128: 154 (1966).

= *Pinguicula vulgaris* var. *leptoceras* Ferrarini p.p. Webbia 22(2): 295–404 [351] (1967).

= *Pinguicula leptoceras* Rchb. p.p. (only for the specimens from "Cima e Cintura del Procinto"), sensu Pichi-Sermolli in Ferrarini et al.: Prodromo alla flora della regione Apuana, seconda parte (Oxalidaceae – Campanulaceae), Studi e Documenti di Lunigiana XIII (La Spezia) 1997: 242.

= *Pinguicula longifolia* Ramond ex DC. subsp. *reichenbachiana* (J. Schindl.) Casper p.p., Ferrarini et al.: Prodromo alla flora della regione Apuana, seconda parte (Oxalidaceae – Campanulaceae), Studi e Documenti di Lunigiana XIII (La Spezia) 1997: 243.

Descriptio

Herba perennis rhizomate brevi simplici adscendente; radicibus adventitiis numerosis filiformibus. *Folia* radicali rosulata, solum adpressa, pauci, 4–8; lamina ambitu ovato-oblonga vel oblonga, obtusa vel acutiuscula, 2–4-plo longiora quam latiora, 20–50 mm longa (sine petiolo), (6–)8–10 (–12) mm lata, applanata, basi in petiolum ~ 10 mm longum plus minusve abrupte attenuata (petiola cupulam formantia), breviora quam scapo, superiore glandulosa-viscosa; laete viridia, rare (in locis solis expositis) rubiginosa; margine haud (maxime ~ 1 mm) involuta, saepe repanda; hibernaculis perhiemantia. *Scapi* 1–2(–4), erecti, teretes, filiformes, parum glandulosi, anthesi 30–40(–50) mm alti, fructificante 60–80 mm alti, uniflori, viridia. *Flores* magni, (19–)22–30 (–35) mm longi (calcari incluso). *Calyx* distincte bilabiatus, viridis margine azureo-violaceis vel (maturitate) subfuscus vel purpureus, persistens, glandulosus, ~ 4.5–6 mm longus, tubo corollae multo brevior; labium superum profunde trilobum saepe irregulariter profunde quattuor- vel quinquelobum, lobis oblongis basin versus vix angustatis, vel ovato-oblongis basin versus distincte angustatis, apice obtusis vel retusis vel acutis (lobo medio saepe bi- vel tripartito), duplo vel triplo longioribus vel latioribus; labium inferum regulariter usque ad basin vel ⅔

3) The epithet is given in honour of Dr Maria Ansaldi, Massa. Before the nomen was published according to the rules of the ICBN *P. mariae* was already used provisionally by Casper & Stimper (2009).

Figure 1. *Pinguicula mariae* Casper, holotype (JE – fol. I, of altogether III).

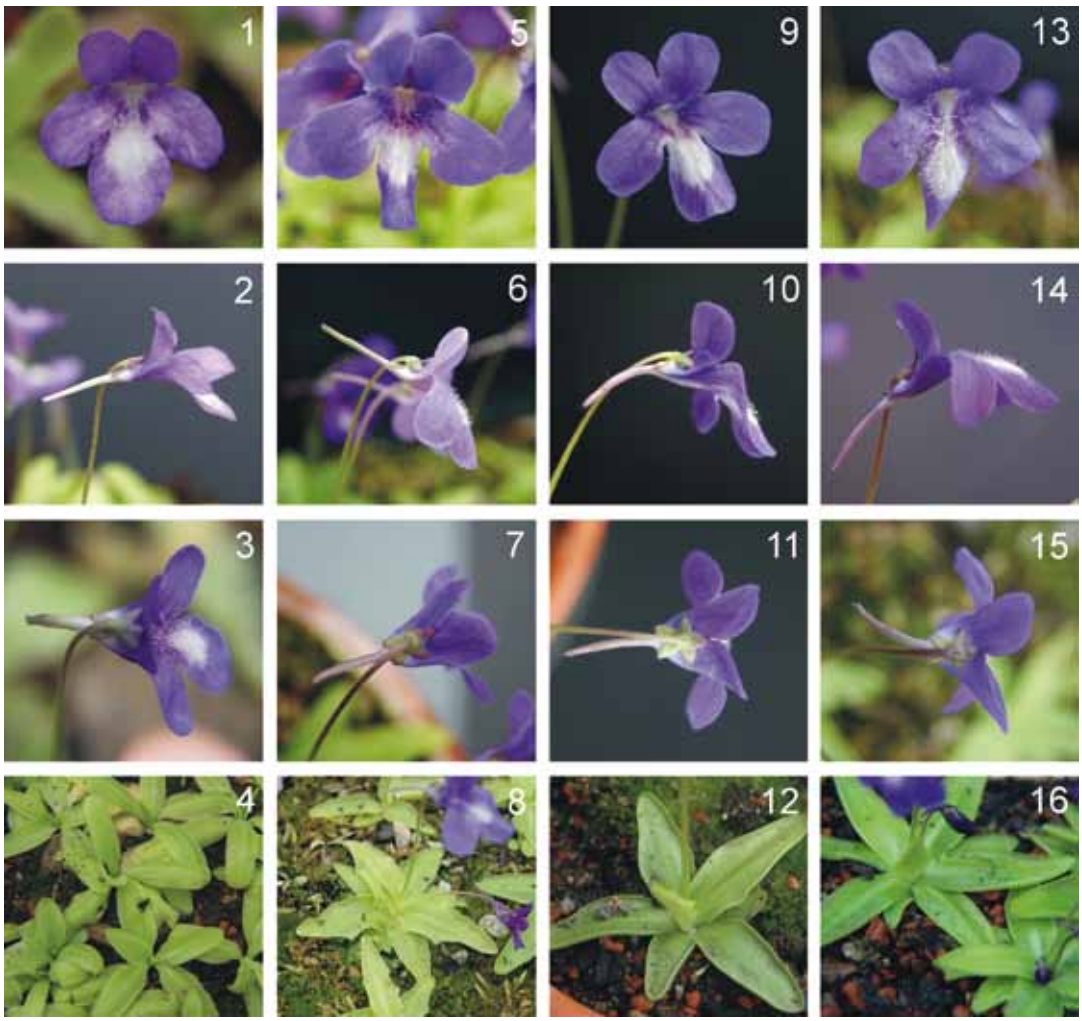

Plate 1. Figs 1–16 *P. mariae*: 1–3, 5–7, 9–11, 13–15 flowers, 4, 8, 12, 16 foliage; Figs 1–4: M^te^ Nona – BGJ 75.1, 1 front view, 2 side view, back view, 4 foliage; Figs 5–8: Isola Santa – BGJ 139, 5 front view, 6 side view, 7 back view, 8 foliage; Figs 9–12: Isola Santa – BGJ 74.1, 9 front view, 10 side view, 11 back view, 12 foliage; Figs 13–16: Lago Trombacco – BGJ 106, 13 front view, 14 side view, 15 back view, 16 foliage. Note the characteristic white hairy spot on the median lobe of the corolla lower lip (Figs 1, 5, 9, 13). The outside of the calyx can be distinctly seen in Figs 3, 7, 11, and 15.

longitudinis bilobum vel irregulariter tri- vel quattuorlobum, lobis ~ 3.5 mm longis, apice acutis vel obtusis. *Corolla* violacea ('ionantha'), bilabiata, labiis distincte diversis, lobis inter se non vel vix tegentibus, lobo medio labii inferi parte proximali distincte late obovato-maculato pilosis multicellu-laribus capitatis albidis vestitis (rare sine macula), lobis lateralibus basi indistincte albido piloso-maculatis vel sine maculis; sparse glandulosa; late dilatata, sub anthesi labium superum cum labio infero ad angulum ~ 180° patente; calyce multo longior; labium superum regulariter bilobum, rare irregulariter trilobum, lobis oblongis apice obtusis, ~ 6,5–8(–9) mm longis et latis, paulum longioribus quam latioribus, sub anthesi antice distincte ad angulum 90° erectis et revolutis; labium inferum regulariter trilobum interdum irregulariter quattuorlobum, lobis magis longioribus quam latioribus, inter se inaequalibus (lobo medio plerumque distincte longiore quam lobis lateralibus, 10–16 × 10–14 mm, apice saepe paulum dilatato, sub anthesi distincte ad

Figure 2. *P. mariae*, Isola Santa, type locality, 20.05.2006. – Photograph: M. Ansaldi.

angulum ~ 90° dependente), non vel paulum (proximali) tegentibus, oblongis, apice obtusis, basin versus vix attenuatis. *Tubus* brevis, infundibuliformis, ~ 5 mm longus et latus, ventraliter ~ 8 mm longus, ad faucem late ampliatus; fauce albido-pilosa, sine palato; laete violaceus ventraliter striis albidis delineatus. *Calcar* elongatum rectum vel leviter arcuatum, ~ (7–)8–10(–12) mm longum, subacutum vel obtusum, laete violaceum. *Stamina* 2, basi ovarii adnata; filamenta breves incurvata. Antherae 2, thecis connatis. *Granula pollinis* subglobosa-prolata, ~ 30–40 µm in diametro, stephano(6–7)colporata. *Ovarium* superum, sessile, subglobosum, uniloculare, in stylum brevissimum productum, ovula plura placentae centrali liberae sessilia; stigma terminale brevissime inaequaliter bilobum, roseolum, fimbriatum, antheris umbrelliformiter obtegentum. *Capsula* subglobosa, ~ 3 × 3.5(–4) mm vel ~ 3.8 × 3 mm, unilocularis, bivalvis, fusca, maturitate erecta calyce persistente paulum longior vel plusminusve inclusa. *Semina* cylindracea dorso convexa, 600–800 µm longa, ~ 200 µm lata, scobiformes, brunnea, testa reticulata. *Chromosomatum* numerus 2n = 32 (tetraploideus). – Floret: IV; fructifer V–VI.

Distributio: Italia, in montibus Etruriae Apuanarum Alpes dicta endemica; convalle 'Turrite Secca' inter villam 'Isola Santa' et 'Casa Riccia', convalle 'Torrente Turrite di Gallicano presso Lago Trombacco', convalle 'Canale di Castagnolo presso Ruosina', in montibus Nona-Procinto.[4]

Habitatio: In scopulis petrosis humidis cretaceis; etiam in pascuis udis subalpinis; in regione collino et montano inter ~ 300 m and ~ 1000 m supra mare; at Isola Santa *Adiantum capillus-veneris,*

4) Possibly the population from Orrido di Botri (Apennines of Lucca) is representing *P. mariae*, too (information by L. Peruzzi).

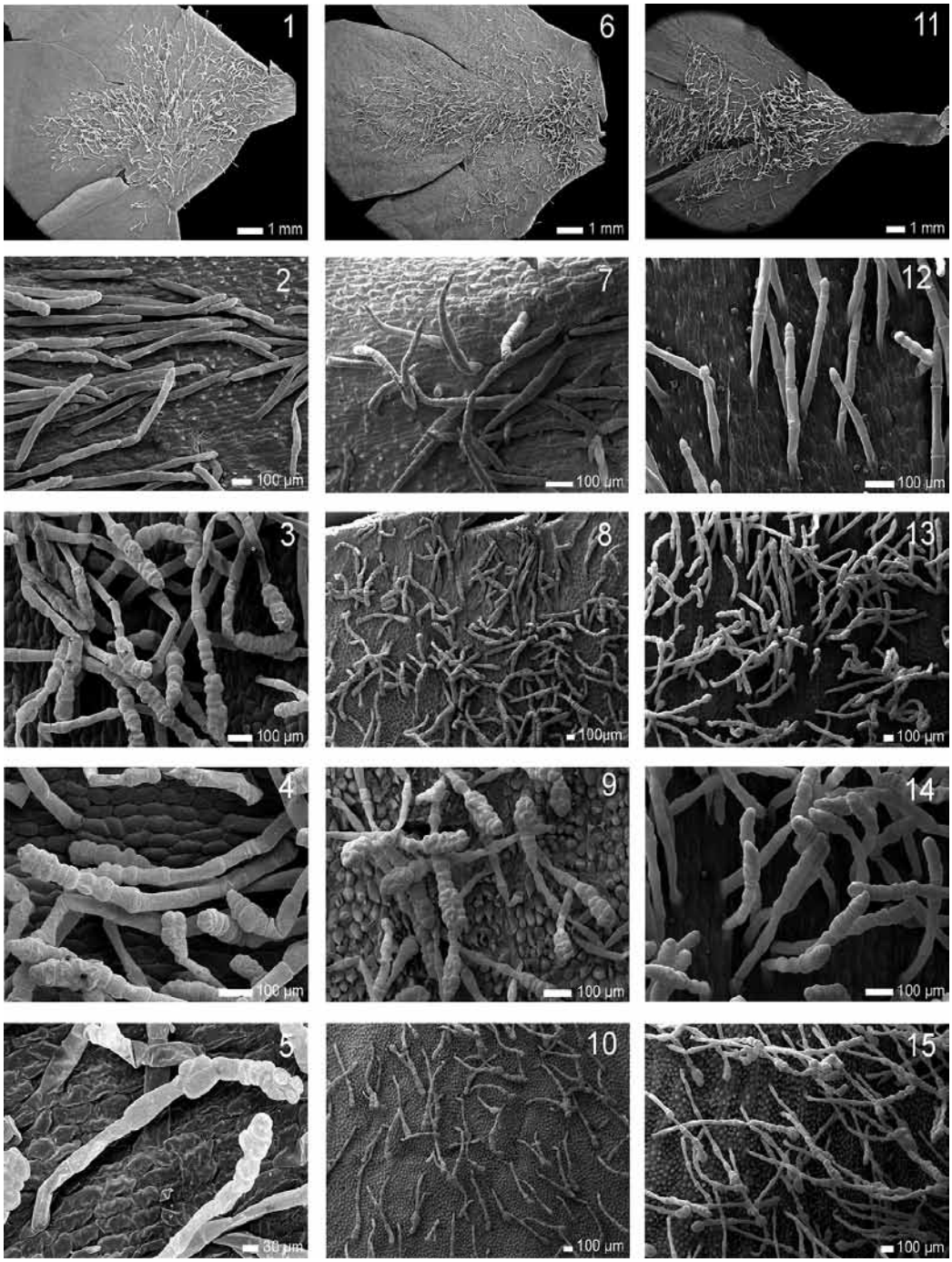

Plate 2. Figs 1–15 *P. mariae*, indument (hair covering pattern and hair morphology) of three corollas (corolla 1, Figs 1, 5: M^{te} Procinto – BGJ 75.1, Figs 2–4: M^{te} Procinto – St. 54; corolla 2, Figs 6–10: Isola Santa – BGJ 74.1; corolla 3, Figs 11–15: Lago Trombacco – BGJ 140). – Figs 1, 6, 11 corolla lower lip median lobes, total view, dense hair covering pattern extended at most over the basal region of the lip; Figs 2, 7, 12 *Asparagus*-like hairs of the proximal part of the tube, hairs consisting of about three to five stalk cells arranged in a single row, headed by two to three cells (the head cell tipped) directed backwards to the tube; Figs 3, 8, 13 hairs of the transitional region of lobes and tube, more or less transversely arranged; heads 4–5-celled; Figs 4, 9, 14 details, showing the multicellular capitate hairs (stalk part single-breasted ~ 4–6-celled), Figs 5, 10, 15 head part rather large consisting of about 10 cells or more arranged in two to four cell rows. – Preparation: R. Stimper, I.-M. Herrmann; SEM: I.-M. Herrmann.

Hypericum coris, Globularia incanescens, Potentilla caulescens, Salix crataegifolia, et *Buphthalmum salicifolium* subsp. *flexile* socii saepe sunt.

Pinguicula mariae differt a speciebus valde similibus:

A *P. reichenbachiana* J. Schindl. foliis brevioribus, non distincte 'longifoliis'; lobis corollae labii inferi inter se non vel vix tegentibus, lobo medio parte proximali distincte albide maculato macula ambitu ad instar guttae, lobis lateralibus sparse albide maculatis.

A *P. poldinii* Steiger & Casper foliis solum adpressis, non coriaceis; lobo medio parte proximali distincte albide maculato, macula non dictyophlebia.

Description

Herb perennial, low, rosette forming, scapose, overwintering with a bulb-like winter-bud. *Stem* short, erect, with ascending, not branching rhizome and numerous adventitious fibrous roots. *Foliage* (*leaf rosettes*) 40–80(–100) mm in diameter, with few, 4–8 leaves lying flat on the ground; homophyllous; leaves in outline ovate to oblong, obtuse, rounded to acute at the apex, narrowed at the base, 2–4 × as long as broad, 20–50 mm long, (6–)8–10(–12) mm broad, flat (spread out horizontally), at the base narrowed into a petiole ~ 10 mm long (petioles forming together a kind of cup); shorter than the scape; the margin entire uneven and waved, ~ 1 mm involute, the upper surface densely covered with mucilaginous sessile and stalked glands; on shadowed stands pale-green, in the bright sun often purple-brown. *Scapes* 1–2(–4), erect, (25–)30–40(–50) mm tall (bearing ripe fruits up to 60–80 mm), terete, tapering from the base to the apex, 1-flowered, beneath the flower densely covered with stipitate glands, to the base glabrous. *Flowers* relatively large, (19–)22–30(–35) mm long (spur included). *Calyx* distinctly bilabiate, green, in bright sun and at fruiting time brownish to purple; covered on both surfaces and on the margin with stipitate glands, 4–6 mm in total diameter, much shorter than the tube; the lobes at the tip not denticulate or notched; the upper lip divided nearly to the base in 3(–6) lobes, the lobes ovate-oblong to oblong, sometimes additionally inequally up to ½–⅙ divided. 2–3 × as long as broad; lower lip divided to ⅙ to maximum to the base into 2 long, more or less oblong, acute lobes. *Corolla* distinctly two-lipped, shining blue-violet, at the throat and especially on the proximal part of the middle lobe distinctly whitely spotted, spur violet to whitish; upper lip consisting of 2 nearly equal oblong inter se non covering lobes 1.5–2 × as long as broad, ~ 7.5 mm long, ~ 3.5 mm broad, erect, recurved, apex obtuse to more or less rounded, externally much sparsely covered with stipitate glands, internally with longer clavate hairs near the base; lower lip much larger than the upper lip, with 3 (sometimes 4–5) non or rarely covering lobes, apex rounded sometimes slightly truncate, externally sparsely covered with stipitate glands, internally with longer clavate hairs near the base, lobes oblong to obcuneate to obovate, unequal, not overlapping or rarely overlapping, the middle lobe distinctly longer and broader than the lateral ones, 10–16 mm long, 10–14 mm broad, apex rounded and somewhat dilatate, to the base meagre narrowed, the front half often distinctly saddle-shaped, the proximal half with a characteristic white spot in outline drop-like and densely beset with long clavate hairs; the front part of all the three lobes bending downwards; the whole corolla outspread ('dilatate'), i.e., widely open (opening-angle ~ 120–180°) and enlarged; the mostly white (rarely reddish) haired throat is open, too. *Tube* broadly funnel-shaped, short, ~ 5 mm (ventrally up to ~ 8 mm) long, at the entrance to the throat somewhat wider, without palate, comparably densely covered with clavate hairs. *Spur* straight

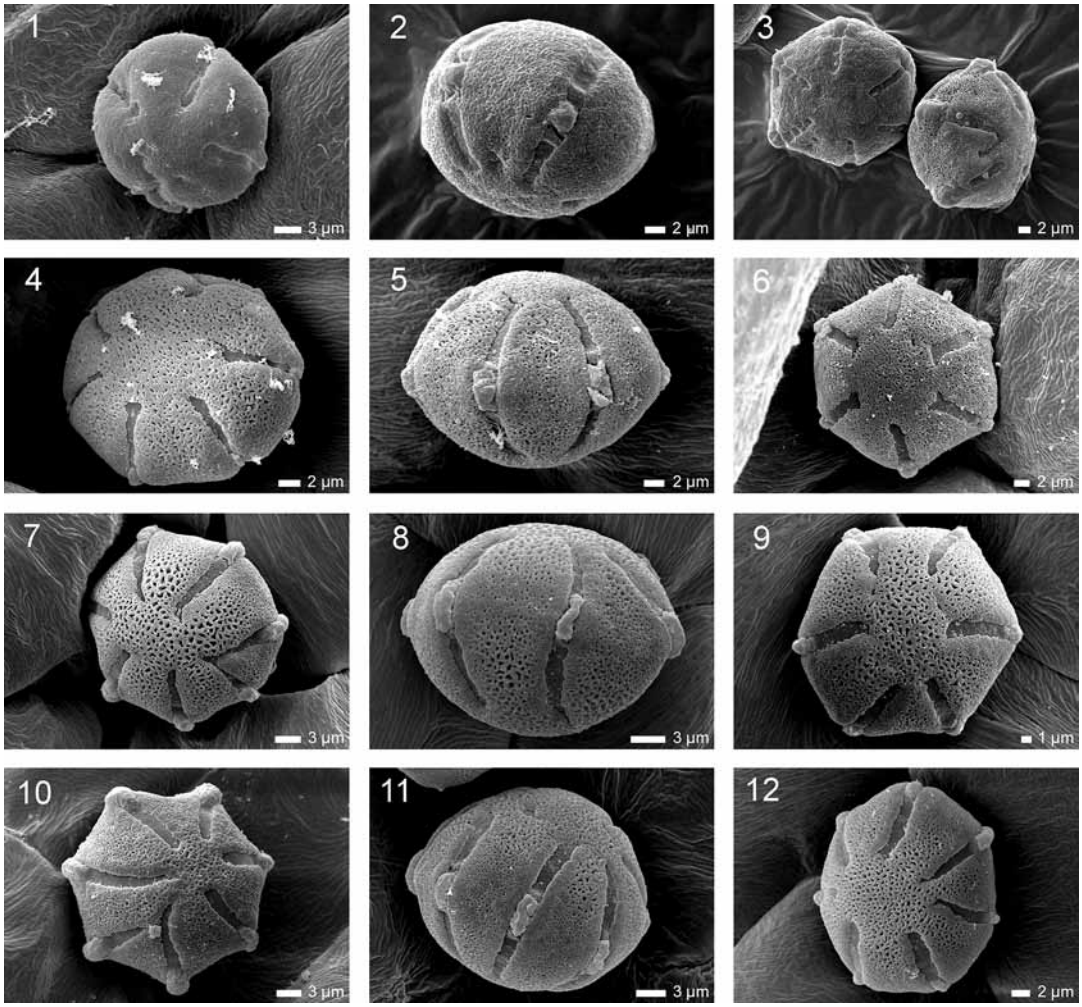

Plate 3. Figs 1–12 *P. mariae*, pollen grains; Figs 1–3: M^te^ Nona – BGJ 75.1; Figs 4–6: Isola Santa – BGJ 74.1; Figs 7–9: Isola Santa – BGJ 139; Figs 10–12: Lago Trombacco – BGJ 106; scanning microphotographs. – Figs 1, 3 (grain on left side), 4, 6–7, 9–10, 12 pollen grains in nearly polar views showing the distinctly reticulate surface pattern of the polar fields, of the adjoining equatorial area, and the six to seven colpi; in Figs 7 and 10 syncolpi are evident; Figs 2, 3 (grain on right side), 5, 8, 11 in nearly equatorial views, showing colpi with pores, the reticulate surface pattern is more or less interrupted in the equatorial zone (see especially Figs 8, 11). – Preparation: R. Stimper; SEM: I.-M. Herrmann.

or slightly incurved, 7–12 mm long, longer than the tube, terete, greenish. *Stamens* 2, the short filaments slightly incurved; anther thecae more or less confluent roofed by the fringed larger lip of the stigma. *Pollen grains* prolate-subglobular, ~ 30–40 µm in diameter, stephano(6–7)colporate. *Ovary* nearly globular, sessile, ~ 2 mm in diameter, densely stipitate-glandular; style short; stigma bilobed, reddish, larger lower lobe fimbriate. *Capsule* erect, depressed-(sub)globose, ~ 3–3.8 mm in diameter, ~ 3–4 mm long, by a little longer than the persisting calyx. *Seeds* minute, like sawdust ('scobiformis'), ~ 600–800 µm long, ~ 200 µm thick, surface reticulate. Number of chromosomes 2n = 32 (tetraploid). – Flowering IV; fruiting V–VI.

From *P. reichenbachiana* J. Schindl. distinguished by the short not 'longifolia'-like leaves, by the corolla lower lip lobes not covering, and by the whitely spotted (with a single spot in outline drop-like) middle lobe.

From *P. poldinii* Steiger & Casper distinguished by the short not leathery leaves, by the calyx lobes not denticulate or notched, and by the whitely spotted longitudinally violet veined corolla lower lip middle lobe.

Specimina visa

Flora Italia; Apuanische Alpen: Turrite Secca, felsige Hänge zwischen Isola Santa und Casa Riccio, … JE! Apuanische Alpen, Isola Santa, Torrite, leg. 27.04.2004, J. Casper, blühend, as *P. mariae* [cult. BGJ 74.1] – JE! Isola Santa, zwischen Tre Fiumi und Torrite, ~ 300 m, leg. 29.04.2005, J. Casper – JE! [cult. BGJ 104]. — Lago Trombacco; leg. 08.09.2004, Rosemarie Stimper – JE! [cult. BGJ 106]. Lago Trombacco, Population fruchtender Pinguikeln am felsigen, vom Wasser überrieselten Straßenrand im Torrente Turrite di Gallicano, westlich des Abzweigers nach Vergémoli, ~ 400 m asl., auf Kalk; leg. 20.06.2005, Maria Ansaldi, E. Hübl., Rosmarie Casper, J. Casper – JE! (= cult. BGJ 140). — Nel Canale di Castagnolo presso Ruosina, leg. 21.05.1904, E. Barsali – PI! (fruiting). — Westfuß des Monte Procinto ob Stazzema, an einer senkrechten, westexponierten Felswand an quellig-tuffiger Stelle, mit *Schoenus nigricans*, 910 m. Leg. 27.05.1948, W. Koch – ZT! Am Fuß des Monte Nona in der Scharte gegen den Monte Procinto, NW exponiert, auf Kalk, schattige feuchte Felsnischen und Höhlen unter vorspringenden Felswänden. Leg. H. Metlesics, 26.06.1955 – LI-(MET)! Aufstieg zum Monte Procinto (bei Stazzema, SE Massa) und Rundweg um den Gipfel; Kalkfelshänge und subalpine Wiesen, ~ 1100 m. Leg. J. Grau & E. Bayer, 14.06.1987 – M! Com di Stazzema, cintura del Procinto. Esposiz. N. alt. 1000 m circa, calcar. Leg. 03.07.1991, G. Aldobrandi, C. Negri & G. Padovani – FI! Mte. Nona, Alpi Apuane, leg. 23. maggio 1982, Lucia Amadei (as *Pinguicula* cf. *leptoceras* Rchb.) – PI! Monte Nona, cult. Rosemarie Stimper 75.1 (as *P. reichenbachiana*), leg. 16.05.2004 – JE!

Photographs seen

On road Castelnuovo di Garfagnana – Massa, between Torrite and tunnel 'Tre Fiumi', 400 m. N 44° 04.355' / E 10° 20.787'. 10.07.1999. Limestone. Photograph J. Schlauer – JE! Idem. 390 m. N 44° 04.597 / E 10° 20.633', (Capsules globular) 03.09.2000. Photograph J. Schlauer – JE! [Collector's annotation: "probably *P. longifolia* ssp. *reichenbachiana*"] — M^{te} Procinto & M^{te} Nona above Stazzema. Vertical rock walls. 1050 m. N 43° 59.761' / E 10° 20.164'. 30.04.1999. Limestone. Very abundant site, and end of April in full flower. Photograph J. Schlauer – JE! Idem. Beginning of September most leaves still green. (Capsules globular). 02.09.2000, photograph J. Schlauer – JE! [Collector's annotation: "probably *P. longifolia* ssp. *P. reichenbachiana*"] — Torrente Turrite di Gallicano, Lago Trombacco, fruiting, September 2004, photograph Rosemarie Stimper – JE!; Lago Trombacco, 22.04.2009, photograph Maria Ansaldi – JE!

Annotations and observations

Following the detailed information given by Schlauer and Steiger, in 2004, at the beginning of April, we went to the site called by them "between Torrite and tunnel Tre Fiumi" and found a rich *Pinguicula* population in full flower which we localised under the mapname 'Isola Santa'. We saw immediately that we had ahead of us a *Pinguicula* hitherto unknown, however, similar to *P. reichenbachiana* from M^{ti} Nona-Procinto or *P. poldinii* from Friuli, respectively. During September 2004, Rosemarie Stimper found a corresponding population in the neighbouring valley Torrente Turrite di Gallicano near Lago di Trombacco. In the following years (2005, 2006)

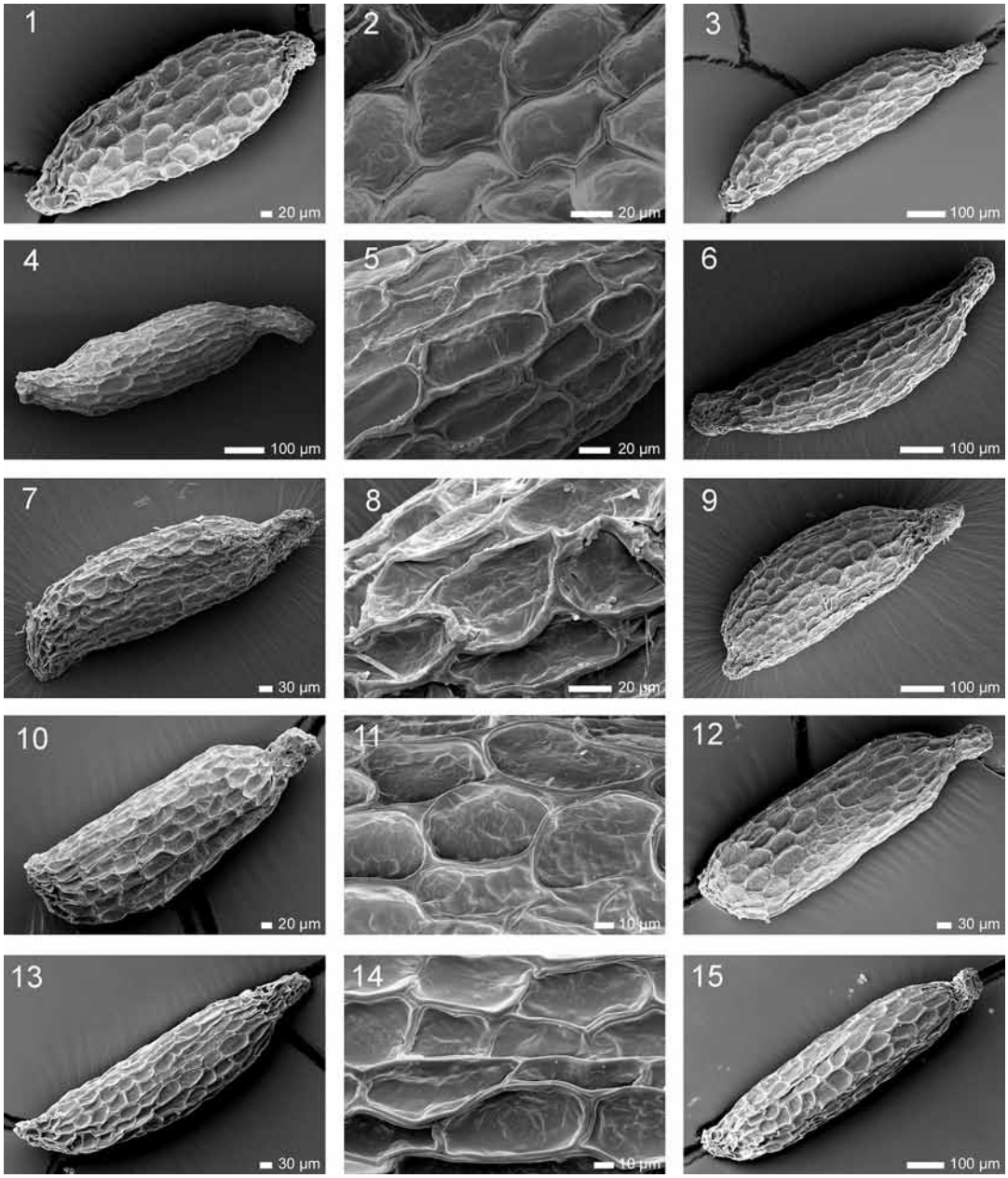

Plate 4. Figs 1–15 *P. mariae*, seeds; Figs 1–3: M^{te} Nona – BGJ 75.1; Figs 4–6: Isola Santa – BGJ 74.1; Figs 7–9: Isola Santa – BGJ 104; Figs 10–12: Isola Santa – BGJ 139; Figs 13–15: Lago Trombacco – BGJ 106; scanning microphotographs. – Figs 1, 3–4, 6–7, 9–10, 12–13, 15 seeds of slightly different shape, with the somewhat larger micropylar appendage on the right, and with the shorter chalazal appendage at the left pole; Figs 2, 5, 8, 11, 14 exotesta (seed coat) with cell walls distinctly thickened. – Preparation: R. Stimper; SEM: I.-M. Herrmann.

we visited repeatedly these sites and could confirm our first impressions. We didn't succeed in detecting additional localities.

Studies in the herbaria of Bologna (BOLO), Firenze (FI), and Pisa (PI) nearly remained without success, with a single exception: In PI, a voucher collected in 1904 by Barsali "nel Canale di Castagnolo presso Ruosina" showed fruiting specimens with capsules distinctly globular. These

specimens could represent *P. mariae*. Our search for a population in the region reported remained in vain. Checking Bertoloni's 'erbario' (BOLO) we could not find any specimen of our new species. Apparently, he and his son didn't visit the localities where *P. mariae* occurs today.

In his collection there is a fine specimen of the related *P. reichenbachiana* named "206. *Pinguicula*". It shows clearly the typical long, *P. longifolia*-like leaves and the big ovate capsule. The handwritten label seems to be written by two different persons. As usual, we find on the top of the label the reference annotation to his works, in this case to his *Flora Italica*: "*Pinguicula vulgaris* L. Bert. Fl. It. 1. p. 115. n. 1.", apparently written by Bertoloni himself. The main text of the label says: "206. / *Pinguicula* / circa Saorgio in rupestribus irriguis / Junio / Misit Moris 1830." We don't know the writer. Nevertheless, the phrase fits well to the quotation in *Flora Italica* (1834: 115): "Habui … ex rupestribus irriguis di *Saorgio* a Prof. Morisio… ."[5]

We report about the finding of this voucher because we have learned that Bertoloni subordinated the Moris specimen to *P. vulgaris* L. and did not perceive its specific nature. The locality *Saorgio* is identical with *Gorge of Saorge,* the actual name of the today French part of Roya Valley in the Alpes Maritimes (Alpi Marittime).

Schindler (1908: 13) founded his *P. reichenbachiana* on a voucher collected in May 1879 by A. Engler in the "Alp. Marit., Dalmazzo di Tenda" and determined as "*Pinguicula grandiflora* Lam. ß. *longifolia* Godr. Gren." (WU) by the collector. On Schindler's corresponding revision label we read "*Pinguicula Reichenbachiana* mh. rev. J. Schindler 1907".[6]

He didn't know the specimens reported as *P. vulgaris* ß. *grandiflora* by Sommier (1894: 26) and as *P. vulgaris* var. *grandiflora* by Baroni (1897–1908: 377) from the locality "sulla cima e sulla cintura del Procinto" in the Apuan Alps. Casper (1959: 279, 1962: 71, 1966: 154) classified these specimens as *P. reichenbachiana* or *P. longifolia* subsp. r*eichenbachiana*, respectively.[7] Probably the quotation of Sommier (1894) is the first which has to be connected with our taxon.

Studying the M^{ti} Nona-Procinto *Pinguicula* again we conclude that it is related to the Schindler taxon even if sufficient different. It should be recognized as an independent species and should be named *P. mariae*. The specimens gathered and cultivated lack the typical *longifolia*-leaves known from the Roya specimens. By this feature *P. mariae* is very similar to *P. poldinii* from the Friuli mountains range. The white hairy spot on the corolla lower lip is restricted to the median lobe and forms a striking drop-like pattern in outline not known in *P. reichenbachiana* from Roya Valley plants in which the corresponding white spot is extended over the proximal parts of all the three lower lip lobes.

In our opinion, *P. mariae* and *P. poldinii* form a group of species distinguished by its common temperate north-central mediterranean homophyllous growth type, by its tetraploid chromosome level (Casper & Stimper 2009) and by its ecology and geography. As Casper & Steiger

5) Giuseppe Giacinto (Josephus Hyacinthus) Moris (1796–1869), professor of botany and director of the botanical garden of the University of Torino; author of *Flora Sardoa* (1837–1859).

6) Perhaps Schindler has also studied the sheets collected by J. Brunnthaler and O. Porsch, Mai 1907, in the "Ital.-französ. Grenzgebiet, Seealpen: Royatal, zwischen Fontan und S. Dalmazzo di Tenda" (W, WU).

7) Unfortunately, Casper (1959, 1962, 1966) failed at the taxonomic treatment of the various *P. grandiflora* specimens reported by Italian botanists from the Apennines which he believed to belong to *P. reichenbachiana,* too.

(2001: 35) pointed out, there should be a taxonomic unit on the categorial level of series that could be named ser. *Prealpicae*[8].

Sometimes the flowers of *P. mariae* show teratological characters. We rarely observed small flowers with lacking lower lip middle lobe and supernumerous calyx and corolla lobes.

II. *Pinguicula apuana*[9] Casper et Ansaldi nova spec. (Figs 3–4, Plates 5–10)

Type: *Pinguicula grandiflora* W. [Willdenow?]. Bert. Amoen. Ital. p. 325, et Fl. It. 1. p. 117. n. 2. Legi sub Sagro orientali in alpibus Apuanis secus viam inter Fornole et Vinca. Die 6 Junii 1810. [Bertoloni scripsit?!] – BOLO! (Holotypus). – Fig. 3.

Synonyms (selected):

= *Pinguicula grandiflora* Vahl, sensu Bertoloni, Amoenitates … 325 (1819).

= *Pinguicula grandiflora* Willd. (= *P. leptoceras* Rchb.) p.p. (specimina Alpium Maritimarum et Montium Comensis, Praetutiorum et Corsicae excludenda), sensu Bertoloni, Flora Italica … I: 17 (1834).

= *P. vulgaris* L. ß. *leptoceras* (Rchb.) p.p. (specimina "nelle Alpi, alla Majella ed in Corsica" excludenda), sensu Arcangeli, Compendio della Flora Italiana ossia Manuale … 1889: 565.

= *Pinguicula longifolia* subsp. *reichenbachiana* (J. Schindl.) sensu Casper p.p. (specimina Alpium Maritimarum et Montium Aprutiarum excludenda), Repert. Spec. Nov. Regni Veg. 66(1/2): 71 (1962); Biblioth. Bot. 127/128: 154 (1966).

= *Pinguicula vulgaris* var. *leptoceras* Ferrarini p.p., Webbia 21(2): 521–600 [542, 543, 557, 566, 585, 590, 599] (1966); 22(2): 295–404 [306, 325] (1967).

= *Pinguicula leptoceras* Rchb. p.p. sensu Pichi-Sermolli in Ferrarini et al.: Prodromo alla flora della regione Apuana, seconda parte (Oxalidaceae – Campanulaceae), Studi e Documenti di Lunigiana XIII (La Spezia) 1997: 242.

= *Pinguicula longifolia* Ramond ex A. DC. subsp. *reichenbachiana* (J. Schindl.) Casper p.p., Ferrarini et al., Prodromo alla flora della regione Apuana, seconda parte (Oxalidaceae – Campanulaceae), Studi e Documenti di Lunigiana XIII (La Spezia) 1997: 243.

Descriptio

Herba perennis rhizomate brevi simplici adscendente; radicibus adventitiis numerosis filiformibus. *Folia* radicali rosulata, solum adpressa, pauci, 4–8; lamina ambitu ovato-oblonga vel oblonga,

8) *Pinguicula* ser. *Prealpicae* Casper ser. nov. – Diagn.: Homophyllous; corolla satis magna, ~ 20–35 mm longa (calcari incluso), late ampliata, i.e., lobis labii superi valde reflexis, lobo medio labii inferi pendulo; calcar multo longius quam in *P. vulgari* vel *P. leptocerate*; capsula subglobosa; chromosomatum numerus 2n = 32 (tetraploideus). Typus seriei: *P. poldinii* Steiger et Casper, Wulfenia 8 (2001): 28. – To the series belong *P. mariae* and *P. poldinii*. The similar *P. reichenbachiana* should be excluded because of its heterophyllous foliage. In future it has to be investigated whether the homophyllous *P. vallis-regiae* from Abruzzo will be a member of the group, too. It will mainly depend on the number of chromosomes.

9) The epithet is chosen after the growth locality Apuan Alps. It was already used provisionally by Casper & Stimper (2009) before it has been published in our paper according to the rules of the ICBN.

Figure 3. *P. apuana* Casper et Ansaldi, scanning-copy of the holotype (originally determined as *Pinguicula grandiflora* W.): Sagro orientali in alpibus Apuanis secus viam inter Fornole et Vinca. Die 6 Junii 1810. – BOLO, ex horto sicco Bertolonii).

obtusa vel acutiuscula, 2–4-plo longiora quam latiora, 20–50 mm longa (sine petiolo), (6–)8–10 (–12) mm lata, basi in petiolum ~ 10 mm longum plus minusve abrupte attenuata, breviora quam scapo, superiore glandulosa-viscosa; laete viridia, rare (in locis solis expositis) rubiginosa; margine haud (maxime ~ 1 mm) involuta, saepe repanda; hibernaculis perhiemantia. *Scapi* 1–2 (–4), erecti, teretes, filiformes, parum glandulosi, anthesi 30–40(–50) mm alti, fructificante 60–80 mm alti, uniflori, viridia. *Flores* magni, (19–)22–30(–33) mm longi (calcari incluso). *Calyx* distincte bilabiatus, viridis margine azureo-violaceis vel (maturitate) subfuscus vel purpureus, persistens, glandulosus, ~ 4.5–6 mm longus, tubo corollae multo brevior; labium superum profunde trilobum saepe irregulariter profunde quattuor- vel quinquelobum, lobis oblongis basin versus vix angustatis, vel ovato-oblongis basin versus distincte angustatis, apice obtusis vel retusis vel acutis (lobo medio saepe bi- vel tripartito), duplo vel triplo longioribus vel latioribus; labium inferum regulariter usque ad basin vel ⅔ longitudinis bilobum vel irregulariter tri- vel quattuorlobum, lobis ~ 3,5 mm longis, apice acutis vel obtusis. *Corolla* violacea ('ionantha'),

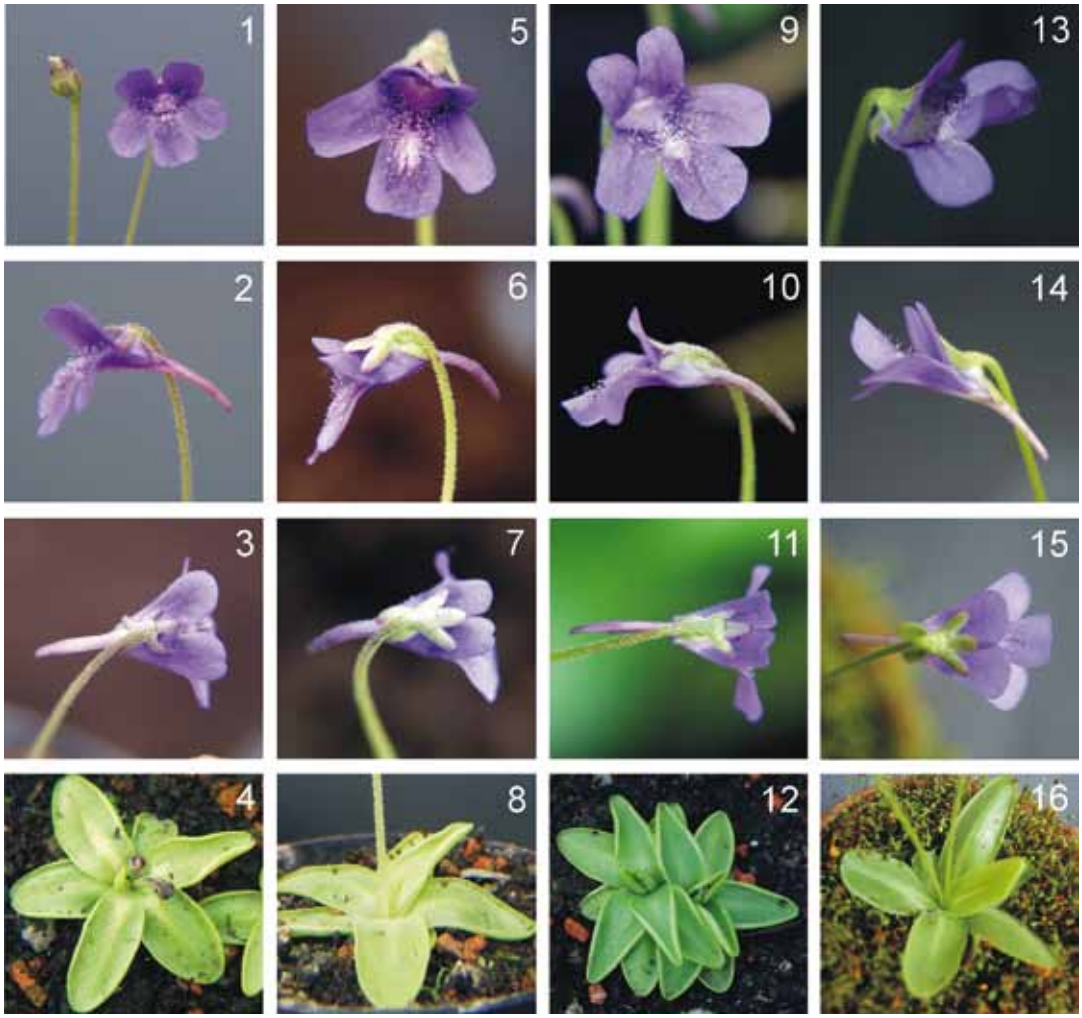

Plate 5. Figs 1–16 *P. apuana*; Figs 1–3, 5–7, 8–11, 13–15 flowers, Figs 4, 8, 13, 16 foliage; Figs 1–4: Monte Corchia – BGJ 59.1, 1 front view, 2 side view, 3 back view, 4 foliage; Figs 5–8: Monte Tambura – BGJ 58.1, 5 front view, 6 side view, 7 back view, 8 foliage; Figs 9–12: Valsora – BGJ 60.1, 9 front view, 10 side view, 11 back view, 12 foliage; Figs 13–16: Via Vandelli – BGJ 173, 13 front view, 14 side view, 15 back view, 16 foliage. Note the white spots on the medium lobe of the corolla lower lip. The calyces can be distinctly seen in Figs 3, 7, 11, and 15. – Preparation and photographs: R. Stimper.

bilabiata, labiis distincte diversis, lobo medio labii inferi parte proximali distincte late obovato-maculato pilosis multicellularibus capitatis albidis vestitis (rare sine macula), lobis lateralibus basi indistincte albido piloso-maculatis vel sine maculis; sparse glandulosa; late dilatata, sub anthesi labium superum cum labio infero ad angulum ~ 180° patente; calyce multo longior; labium superum regulariter bilobum, rare irregulariter trilobum, lobis oblongis apice obtusis, ~ 6.5–8(–9) mm longis et latis, paulum longioribus quam latioribus, sub anthesi antice distincte ad angulum 90° erectis et revolutis; labium inferum regulariter trilobum interdum irregulariter quattuorlobum, lobis magis longioribus quam latioribus, inter se inaequalibus; (lobo medio plerumque distincte longiore quam lobis lateralibus, 10–16 × 10–14 mm, apice saepe paulum dilatato, sub anthesi distincte ad angulum ~ 90° dependente), non vel paulum (parte proximali) tegentibus, oblongis, apice obtusis, basin versus vix attenuatis. *Tubus* brevis, infundibuliformis,

Figure 4. *P. apuana* at natural stands. Left: on perpendicular rock walls at Tre Fiumi. Right: on calcareous cree at M^te^ Corchia (Fociomboli). – Photographs: M. Ansaldi.

~ 5 mm longus et latus, ventraliter ~ 8 mm longus, ad faucem late ampliatus; fauce albido-pilosa, sine palato; laete violaceus ventraliter striis albidis delineatus. *Calcar* elongatum rectum vel leviter arcuatum, ~ (7–)10(–11) mm longum, subacutum vel obtusum, laete violaceum. *Stamina* 2, basi ovarii adnata; filamenta breves incurvata. Antherae 2, thecis connatis. *Granula pollinis* subglobosa-prolata, ~ 30–40 µm in diametro, stephano(6–7)colporata. *Ovarium* superum, sessile, subglobosum, uniloculare, in stylum brevissimum productum, ovula plura placentae centrali liberae sessilia; stigma terminale brevissime inaequaliter bilobum, roseolum, fimbriatum, antheris umbrelliformiter obtegentum. *Capsula* conoidea, ~ 3 × 3.5(–4) mm vel ~ 3.8 × 3 mm, unilocularis, bivalvis, fusca, maturitate erecta calyce persistente paulum longior vel plusminusve inclusa. *Semina* cylindracea dorso convexa, 600–800 µm longa, ~ 200 µm lata, scobiformes, brunnea, testa reticulata. *Chromosomatum* numerus 2n = 64 (octoploideus). – Floret: IV–V; fructifer VI–VII.

Distributio: Italia: in montibus Etruriae Apuanarum Alpes dicta endemica; ut in alpe Tambura (via Vandelli), Torrente Renara, Pania della Croce, M^te^ Corchia, Fociomboli, Arni (Tre Fiumi, Galleria del Cipollaio), Forno (MS-Sorgenti del Frigido), Lago di Vaglio.

Habitatio: In scopulis petrosis humidis cretaceis; in regione collino et montano inter ~ 250 m and ~ 1950 m supra mare; *Potentilla caulescens, Veronica urticifolia, Primula auricula, Globularia incanescens, Asplenium trichomanes* subsp. *quadrivalens, Leontodon anomalus, Biscutella apuana* et *Saxifraga lingulata* socii saepe sunt.

Pinguicula apuana differt a speciebus valde similibus:

A *P. vulgari* corollis valde dilatatis, corollae labii inferi labio infero parte proximali distincte bipartite albide maculato.

A *P. leptocerate* (tetraploideo, 2n = 32) numero chromosomatum octoploideo (2n = 64).

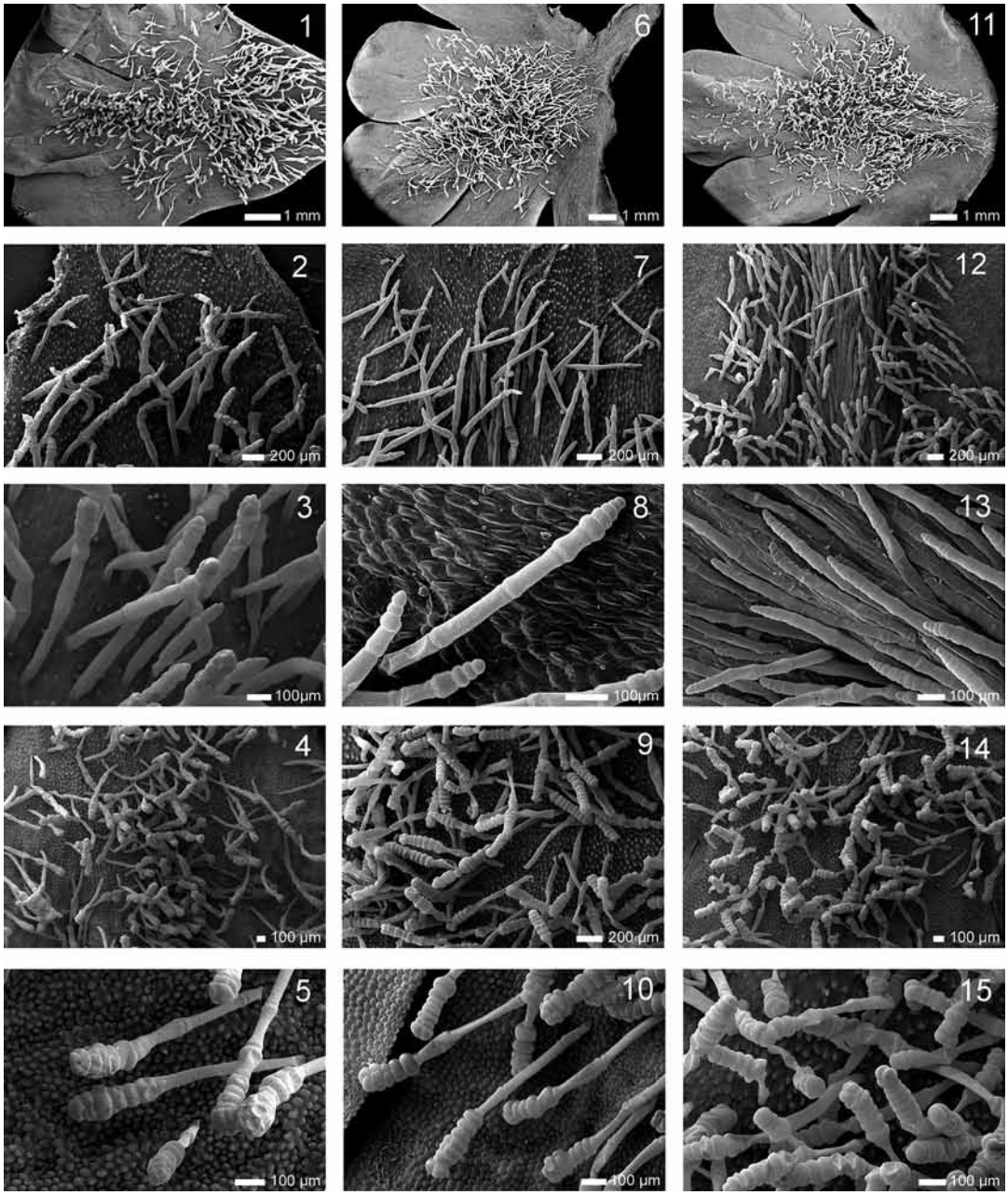

Plate 6. Figs 1–15 *P. apuana*, indument (hair covering pattern and hair morphology) of three corollas (corolla 1, Figs 1–5: M[te] Tambura, BGJ 58.1; corolla 2, Figs 6–10: M[te] Corchia, BGJ 59.1; corolla 3, Figs 11–15: Valsora, BGJ 60.1); scanning microphotographs. – Figs 1, 6, 11 corolla lower lips, indument indistinctly three-parted, central parts beset with densely crowded hairs, at the bases directed backwards to the tube, in the middle arranged into a more or less densely packed strip of single breasted hairs with tipped end cell (Fig. 12); Figs 2, 7 hair covering on both sides of the middle strip; Figs 3, 8 single hairs of the side parts, consisting of a ~ 4-celled rather long stalk and a short single-breathed ~ 4-celled tapering head; Fig. 13 detail of 12, showing the *Asparagus*-like hairs of the densely packed middle strip; Figs 4, 9, 14 capitate hairs of the indistinctly transverse indument zone, heads single-breasted, 6–12-celled, not distinctly tapering; Figs 5–15 hairs of the distal parts of the lobes, with a thin 2–3-parted stalk and topped by a distinctly multicellular head arranged in 2–4 cell rows, the top atmost consisting of 4 and more cells. – Preparation: R. Stimper, I.-M. Herrmann; SEM: I.-M. Herrmann.

Description

Herb perennial, low, rosette forming, scapose, overwintering with a bulb-like winter-bud. *Stem* short, erect, with ascending, not branching rhizome and numerous adventitious fibrous roots. *Leaf rosettes* (40–)60–80(–100) mm in diameter, with few, 4–8(–11) leaves lying flat on the ground; homophyllous; leaves in outline ovate-oblong, obtuse, rounded to acute at the apex, narrowed at the base, 2–4 × as long as broad, (16–)20–40(–55) mm long, (6–)8–12(–20) mm broad, flat, at the base narrowed into a petiole ~ 10 mm long; shorter than the scape; the margin entire uneven and waved, ~ 2 mm involute, the upper surface densely covered with mucilaginous sessile and stalked glands; on shadowed stands pale-green, in the bright sun often purple-brown. *Scapes* 1–2(–4), erect, (40–)55–70(–100) mm (bearing ripe fruits up to 90–135 mm) tall, greenish, terete, tapering from the base to the apex, 1-flowered, beneath the flower densely covered with stipitate glands, to the base glabrous. *Flowers* blue to blue-violet, comparably large, (16–)22–30(–33) mm long (spur included). *Calyx* distinctly two-lipped, sometimes (irregularly) with more than five lobes, green to purple; covered on both surfaces and on the margin with stipitate glands, lobes ~ 4.5–8.5 mm long, mostly shorter than the tube; upper lip divided nearly to the base in 3 (maximum 4) lobes, the lobes ovate-oblong to oblong, up to ½ – ⅙ divided, 2–3 × as long as broad, the middle lobe somehat larger and (rarely) retuse, i.e., with rounded shallowly notched end; lower lip up to ½ – ⅙ two-lobed (rarely irregularly three-lobed), lobes broad-ovate to oblong, at the apex rounded to acute, often spreading (~ 90–110°). *Corolla* distinctly two-lipped, shining blue to blue-violet, on the proximal part of the middle lobe length of the middle nerve with a distinct two-parted white hairy spot, at the throat with white hairs and reddish to violet nerved, spur violet to whitish; upper lip consisting of 2 nearly equal oblong lobes 1.5–2 × as long as broad, ~ 6.5–8(–9) mm long, erect, recurved, apex obtuse to more or less rounded, not covered with trichomes, externally much sparsely covered with stipitate glands; lower lip much larger than the upper lip, with 3 (sometimes 4–5) lobes, apex rounded sometimes slightly truncate, externally sparsely covered with stipitate glands, internally with longer clavate hairs near the base, lobes oblong to tongue-shaped, unequal, mostly not overlapping, the middle lobe distinctly longer and broader than the lateral ones, 10–16 mm long, 10–14 mm broad, apex rounded, the distal half with a two-parted white spot densely beset with long clavate hairs; the front part of all the three lobes bending more or less downwards; the whole corolla outspread ('dilatate'), i.e., widely open (~ 8 mm in diameter; opening-angle ~ 90–120°) and enlarged; the mostly slightly reddish striated haired throat is open, too. *Tube* broadly funnel-shaped, short, ~ 5–6 mm (ventrally ~ 8 mm) long, at the entrance to the throat just so wide, without palate, inside (as the spur) comparably densely covered with long *Asparagus*-like, i.e., acutely capitate hairs directed to the proximal end. *Spur* straight or slightly incurved, thick, at the apex obtuse, ~ (7–)8–11(–13) mm long, inside the distal part with *Asparagus*-like hairs. *Stamens* ~ 2, the short filaments slightly incurved; anther thecae more or less confluent roofed by the fringed larger lip of the stigma. *Pollen grains* prolate-subglobular, ~ 30–40 µm in diameter, stephano(6–7)colporate. *Ovary* nearly globular, sessile, ~ 2 mm in diameter, densely stipitate-glandular; style short; stigma white, two-lobed, the larger lower lobe fimbriate. *Capsule* erect, cone-shaped, ~ 8–13 mm long, ~ 7.5 mm thick, ½ longer than the persisting calyx. *Seeds* minute, like sawdust ('scobiformis'), nearly regular cylindric, at the micropylar pole with a distinct appendage, at the chalazal pole obtuse without an appendage, ~ 600–800 µm long, ~ 220–300 µm thick, surface regularly reticulate. Number of chromosomes 2n = 64 (octoploid). – Flowering IV–V; fruiting VI–VII.

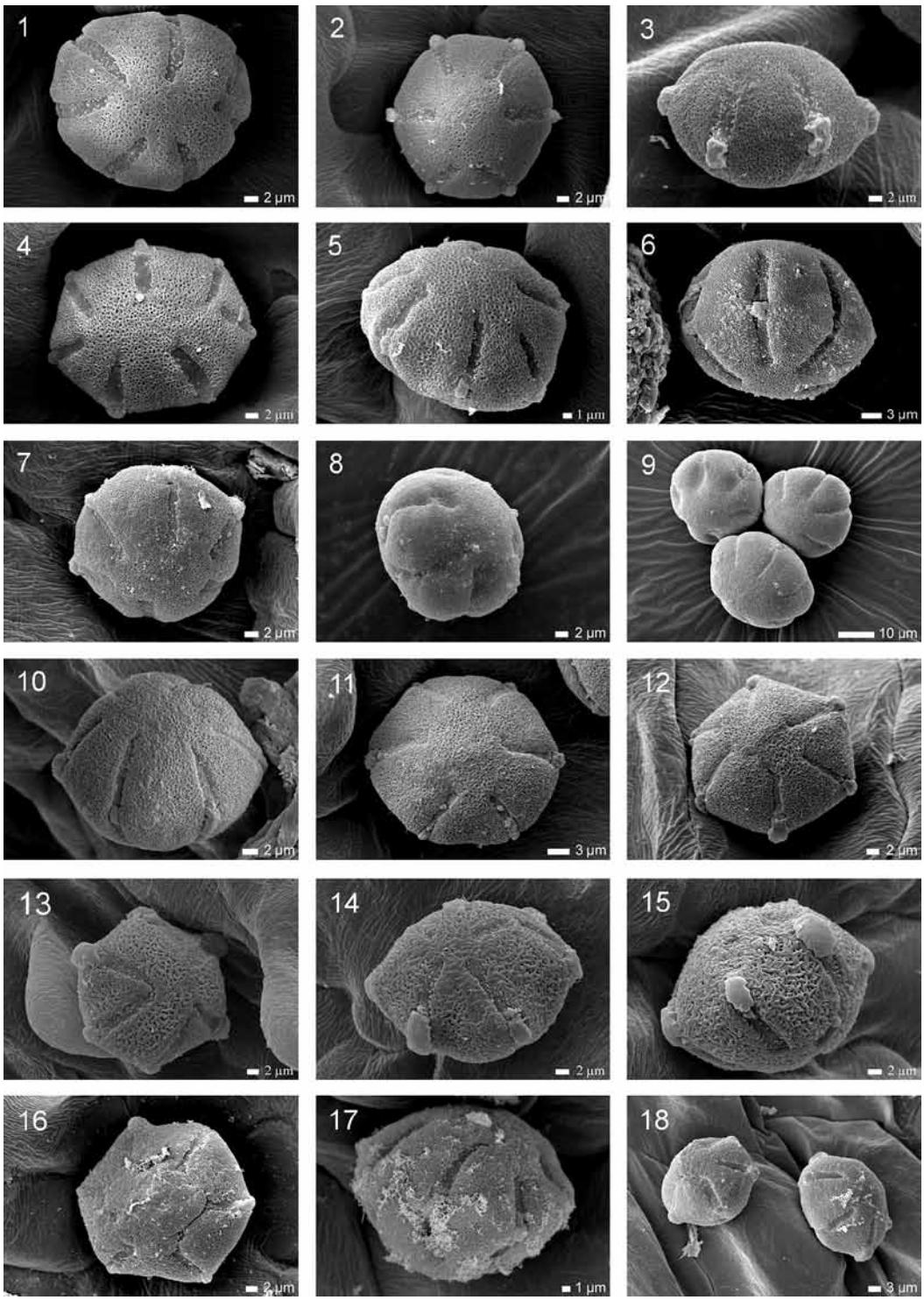

Plate 7. Figs 1–18 *P. apuana*, single pollen grains and pollen grain groups; Figs 1–3: M^{te} Tambura – BGJ 58.1; Figs 4–6: M^{te} Corchia – St 57; Figs 7–9: Valsora – BGJ 60.1; Figs 10–12: Tre Fiumi – BGJ 138; Figs 13–15: Via Vandelli – BGJ 173; Figs 16–18: Forno – BGJ 102; scanning microphotographs. – Figs 1, 2, 4, 7, 10–13, 16 pollen grains, in nearly polar views, showing reticulate surface pattern, the polar field not different structured, and the six to seven colpi; note syncolpi in Figs 4, 5, 13; Figs 3, 5–6, 8–9, 14–15, 17–18 pollen grains, in nearly equatorial views. – Preparation: R. Stimper; SEM: I.-M. Herrmann.

Pinguicula apuana is related to *P. vulgaris* from which it is distinguished by the larger wide open expanded corolla, by the (irregularly) increase in the number of calyx and corolla lobes, by the characteristic two-parted white patch at the bottom of the lower lip middle lobe, by the often reddish streated entrance to the tube, by the long and strong spur, and by the cone-shaped (not really peer-shaped or subglobular) capsule.[10]

Apart of that, from *Pinguicula leptoceras* it is distinguished by the number of chromosomes (octoploidy – 2n = 64 – versus tetraploidy – 2n = 32; Casper & Stimper 2009).

Distribution: Italy: endemic in the Apuan Alps over limestone; e.g., growing in the mountain range of Pizzo D'Uccello, M^te^ Pisanino, M^te^ Sagro, M^te^ Tambura (via Vandelli), Pania Croce, M^te^ Corchia, and Fociomboli, as well as in the hilly region near Arni (Tre Fiumi, Galleria di Cipollaio), Forno (MS-Sorgenti del Frigido), and Lago di Vagli.

Habitat: On perpendicular rocks (Tre Fiumi, Forno), in limestone cree (Fociomboli); in hills and mountains between 250 m and ~ 1950 m; growing often together with *Potentilla caulescens, Veronica urticifolia, Primula auricula, Globularia incanescens, Asplenium trichomanes* subsp. *quadrivalens, Leontodon anomalus, Biscutella apuana,* and *Saxifraga lingulata.*

Specimina visa

Monte Sagro, 1. Juli 1808, leg. A. Bertoloni – BOLO! – Monte Tambura (Alpi Apuane – MS). In Tambura … 21. Julii 1819, leg. A. & J. Bertoloni – BOLO! (as *P. grandiflora*). – In Tamburá Alpium Apuanarum, qua respicat Cafferoniarum. Die 1 Augusti 1827, leg. A. & J. Bertoloni – BOLO! (as *P. grandiflora*). – Lungo la Via Vandelli, a quota 1250 e 1600 m. 26.6.'03. Legit: Maria Ansaldi e Gianni Bedini – JE! (as *Pinguicula* sp.). Carcaraia di Monte Tambura, versante Nord, (Alpi Apuane), m 1450 circa. 13.07.2006, leg. F. Garbari – PI. Monte Tambura, versante Nord (Alpi Apuane), m 1650 circa, Presso Passo della Focolaccia. 13.07.2006, leg. F. Garbari – PI. Dolina sommitale del M.Tambura, m 1750 circa, presso neve, con *Soldanella alpina*. 13.07.2006, leg. F. Garbari – PI. —Torrioni del M. Corchia (Alpi Apuane – LU) ~ 1200 m s.l.m. 24.6.'03. Lungo la strada, al primo stillicidio che si incontra salendo. Legit: Maria Ansaldi, Gianni Bedini. – JE! (as *Pinguicula* sp.). Flora Italia. *P. apuana*. Apuanische Alpen, Lucca, M^te^ Corchia unterhalb des Wegkreuzes, Kalkschutthalde, ~ 1100 m, leg. 31.05.2006, J. Casper – JE! — Arni, Tre Fiumi (Alpi Apuane – LU), 23.5.'03. Legit Maria Ansaldi – JE! (as *Pinguicula* sp.). Flora Italia, Apuanische Alpen, Lucca, Tre Fiumi, ~ 800 m, leg. 30.05.2006, J. Casper – JE! (as *P. apuana* n. sp.) —Valsora, Pian della Fioba, 23.5.'03, leg. Maria Ansaldi – JE! (as *Pinguicula* sp.). – Sorgenti del Frigido nell' Alpi Apuane. Leg. 14.05.1863, O. Beccari – WU!

Photographs seen

Forno, upper end of the village, at the Frigido river. Limestone wall at the first influx coming from N into the Frigido river. ~ 190 m, N 44° 06.132' / E 10° 11.267', 11.07.1999, photograph J. Schlauer – JE; 21.06.2005, photograph E. Hübl — On road Castelnuovo of Garfagnana – Forte dei Marmi, W of Campaccio, SW of the tunnel 'Tre Fiumi', Limestone. 810 m, N 44° 03.447' / E 10° 16.056'. 10.07.1999, photograph J. Schlauer – JE. Arni (Alpi Apuana) 23

10) From the all-over-appearance, *P. fiorii* from Majella is very similar. It has to be cleared up whether the chromosome number 2n = 64 (Casper & Stimper 2009; instead of 2n = 32 reported by Tammaro & Pace 1987) refers to the same population.

Maggio 2003, photograph Maria Ansaldi – JE. — Tre Fiumi 10.07.1999, ~ 850 m, photograph J. Schlauer – JE. — 20.05.2006, photograph Maria Ansaldi – JE. — Tre Fiumi, 20.06.2005, photograph E. Hübl – JE [138 BGJ]; 2006, photograph E. Hübl – JE. — Solco Equi, 07.06.2006 – JE. — Campaniletti, Ping-via-Vandelli, 23.06.2006 – JE. — Campaniletti, Ping Can Vernacchi 23.06.2006, – JE. —Via Vandelli, 26 Giugno 2003 – JE. — M. Tambura (Alpi Apuane), photograph Maria Ansaldi – JE. — Fociomboli, 14.06.2006 – JE — Pania Croce, Ping fontana, 01.07.2006 – JE. — Pania Croce, Ping Omo-Morto, 01.07.2006 – JE. — Pania Croce, Ping-casa, 01.07.2006 – JE. — Torrioni del M. Corchia 24.06.'03, photograph Maria Ansaldi – JE. — On 'closed' road (marble transports) to Mte. Corchia above Levigliani. 1130 m. N 44°03.694' / E 10°17.732'(?), 03.09.2000, photograph J. Schlauer – JE. — Monte Corchia, siliceo, 30./31. Maggio 2006, photograph Maria Ansaldi – JE [cult. 136 BGJ]. — Fociomboli, Kalkschutthang (Neigung ~ 35°) unterhalb des Monte Corchia, massenhaft, photograph E. Hübl – JE [cult. 137 BGJ]. — Monte Corchia, ghiaio-calc, 31.05.2006, photograph Maria Ansaldi – JE. — Foce di Moseta above Levigliani, below Rifugio SW slope along creek. 1100 m. N 44° 01.896' / E 10° 18.595'. 11.07.1999, photograph J. Schlauer – JE. — Without information about the locality: Ansaldi et al. 1994: 242, 243 (as *P. leptoceras*).

Annotations and observations

Populations corresponding to our *Pinguicula apuana* have been observed since the beginning of the floristic exploration of the Apuan Alps.

Antonio Bertoloni and his son Giuseppe [11] saw and gathered specimens they thought to be *Pinguicula grandiflora* between Vinca, Forno, and Levigliani in the mountain range of Pizzo D'Uccello, M^te^ Pisanino, M^te^ Tambura, and M^te^ Sagro. Bertoloni quoted in his *Flora Alpium Apuanarum* (*Amoenitates Italicae* … 1819: 325) such a population as *Pinguicula grandiflora* [Vahl sensu Bertoloni] for the first time. The protologue gives a short diagnosis of the plant in question: "nectario subulato, recto, longitudine floris; staminibus superincum-benti; capsula conica." Comparing his taxon with *Pinguicula vulgaris* L., Bertoloni drew attention to the different features "nectarium corolla brevius, anticè curvulum, obtusum, quandoque subbilobum, stamina sita ad latera germinis, capsula ovata". Especially the characteristic "capsula conica" suited well for differentiation.

About the localities he wrote: "In vertice Sagro l.d. *il Poggio*, et secus viam montanam, quae ex vico *Vinca* ducit a *Fornole*, ubi copiosissima, tum in alpe *Tambura*."

In his *Hortus Siccus Florae Italicae* (BOLO) we read on the label (Fig. 3) to the apparently corresponding sheet (*manu* Bertoloni): "Pinguicula grandiflora W. Bert. Amoen. Ital. p. 325, et Fl. It. 1. p. 117. n. 2. Legi sub Sagro orientali in alpibus Apuanis secus viam inter Fornole et Vinca. Die 6 Junii 1810." This specimen seems to be one of the oldest voucher [12] which, without any doubt, represents our *P. apuana*. Therefore, we have chosen it as type. It shows two flowers and two apparently not ripe fruits.

11) Giuseppe (Josephus) Bertoloni (1804–1878), son of Antonio Bertoloni, professor of botany and director of the botanical garden of the University of Bologna.

12) In BOLO we detected a voucher gathered two years ago, with the label (manu Bertoloni ?!): "*Pinguicula grandiflora* W. Bert. Amoen. Ital. p. 325., et Fl. Ital. 1. p. 117. n. 2. Flos recens saturate caerulans. Legi in rupibus secus prata. Monti Sagro Alpium Appuanarum die 1^a^. Julii 1808." It fits well to the voucher we have chosen as type.

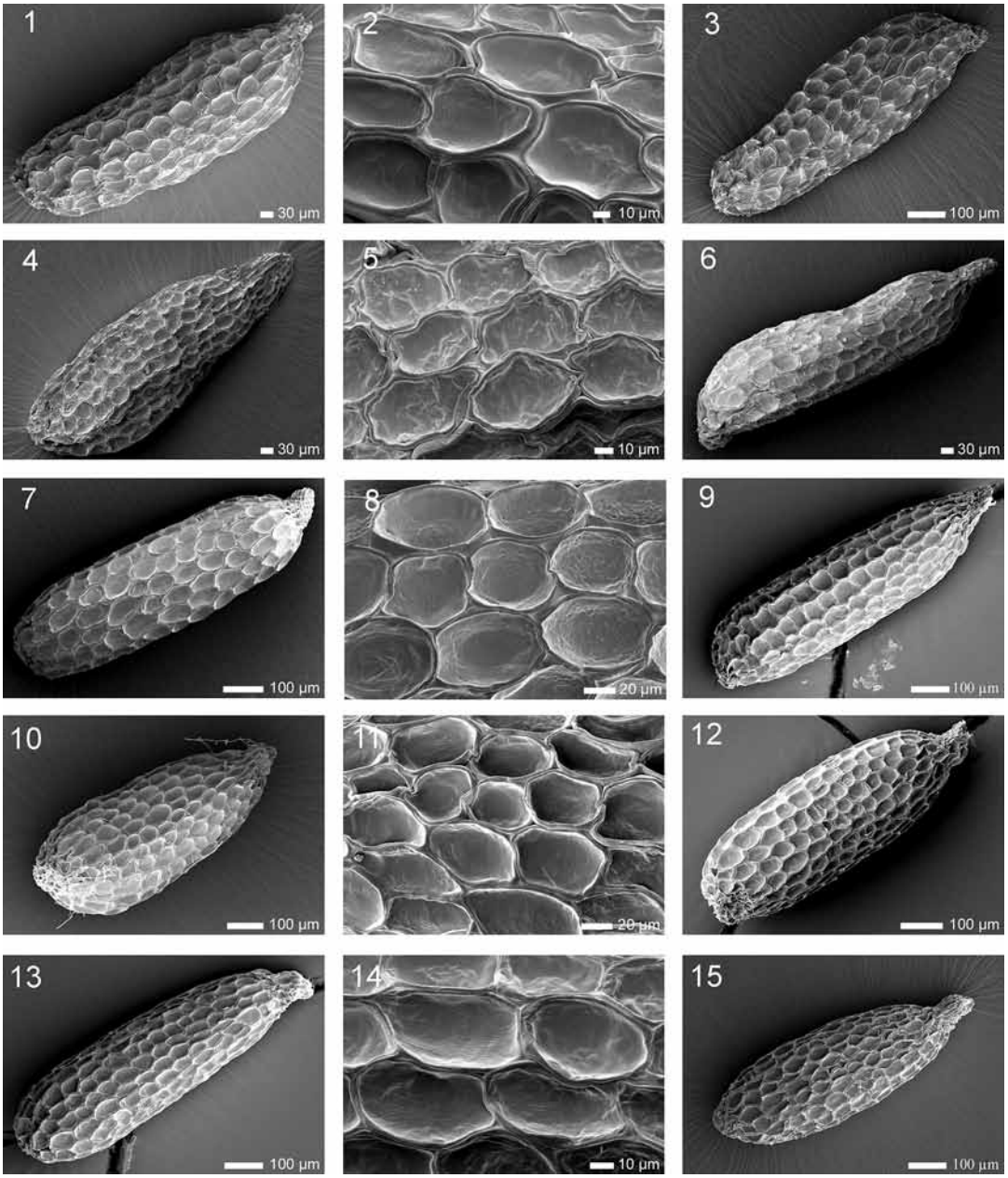

Plate 8. Figs 1–15 *P. apuana,* seeds; Figs 1–3: M[te]. Tambura – BGJ 58.1; Figs 4–6: M[te]. Corchia – BGJ 59.1; Figs 7–9: Valsora – BGJ 60.1; Figs 10–12: Tre Fiumi BGJ 78, 133; Figs 13–15: Forno – BGJ 102, 161; scanning microphotographs. – Figs 1, 3–4, 6–7, 9–10, 12–13, 15 seeds of (sub)cylindrical shape, with distinct rather large micropylar seed poles; contrary, the chalazal pole is at most underdeveloped; Figs 2, 5, 8, 11, 14 exotesta (seed coat) regularly structured, consisting of 6–7 longitudinal cell rows, cells as long as wide or somewhat longer than wide. – Preparation: R. Stimper; SEM: I.-M. Herrmann.

Later on, in his *Flora Italica* (1833: 117) he slightly modified the protologue now writing "*Pinguicula grandiflora* [Willd. sensu Bertoloni]: nectario subulato, florem subaequante; staminibus ovario suppositis; capsula conica" and added "*P. leptoceras* Reich. Cent. 1. p. 69. tab. 82. fig. 171. optime nostra". He enlarged the information about the locality: "Legi copiosam in Apuanarum

alpium verticibus *Sagro*, et *Tambura*.[13] Filius quoque legit in earundem alpium vertice editioro *Pisanino*."

He reported that he had got dried specimens "ex *Col di Tenda* in Pedemontio a Bonjeanio [= *P. reichenbachiana* Schindl.], ex alpibus Comensibus a Visianio [= *P. leptoceras* Rchb.], ex *Majella* Praetutiorum *all'Orfenta* ab Orsino [= *P. fiorii* Tammaro et Pace ?!], ex monte *Grosso* Corsicae a Soleirolio [= *P. corsica* Bern. et Gren.]".

He concluded (Bertoloni 1833: 118[14]): "*Pinguicula vulgaris* L., et *Pinguicula grandiflora* Lamk. sunt plantae valde ludibundae." That means many botanists would consider *Pinguicula grandiflora* nothing else than a sort of *P. vulgaris*. But he would have studied the plant "in vivae in loco natali". On the other hand, "*P. longifolia* De Cand. … est lusus *Pinguicula grandiflora* foliis longioribus". Finally, he asked: "Cur igitur haec a recentiorum quibusdam iterum profertur in speciem?"

From these reports we learn that Bertoloni was not aware of the taxonomic situation in the genus *Pinguicula* in Italy and the neighbouring countries. Like his contemporary colleagues he thought that all large blue-flowering *Pinguicula* specimens would belong to *P. grandiflora* sensu Vahl or Lamarck, respectively, an opinion that was partly corrected not until by Reichenbach (1858) and later on rejected convincingly by Schindler (1907).

The specimens seen near Forno (MS-Sorgenti del Frigido) in 1957 by Casper (1959, 1962, 1966) were in fruit. Flowering specimens from other sites he only saw in sicco. He thought most of them to be identical with *P. leptoceras* Rchb. However, he was not sure about his view. On the voucher labels he used to write "*P. vulgaris* ad *P. leptoceratem* vergens" or "*P. leptoceras* ad *P. vulgarem* vergens" as it had already been practised by Schindler. Casper made the mistake to withhold information about his doubts.[15]

Now, it became clear that the Forno population and all the other populations found in the region and studied newly represent neither *P. leptoceras* nor *P. vulgaris.* We don't hesitate to create a new species called *P. apuana* indicating that it is an endemic species of the Apuan Alps.

In its whole appearance *P. apuana* resembles *P. vulgaris* even if it is larger in all parts.

The corolla is widely open, i.e., upper and lower lip form an angle of about 90° and more. The two-parted white hairy spot on the corolla lower lip median lobe is in its extension comparably limited. It is situated on the proximum half of the lobe and extending length on both sides of the middle nerve. The hairs are directed with their clavate capita to the front of the lobe. The distal part of the lobe is free of any indument (Plate 6, Figs 6, 11). The spur is usually longer – ~ ⅕ × – than in *P. vulgaris* or *P. leptoceras.* The capsule is cone-like (not really peer-shaped).

From the ecological point of view the sites on perpendicular rocks in the plane or hilly zone between 250 m and 800 m or in limestone cree of the mountain zone about 1200 m are quite different from the stands known of *P. vulgaris* or *P. leptoceras*. *P. apuana* is usually growing on

13) From the locality M^te^ Tambura in BOLO a fine voucher of one specimen with three fruits exists: "Legi in Tambura Alpium Apuanarum die 21. Julii 1819. cum filio Josepho, post editas Amoenitatas Italicas."

14) Original text paragraphs in Latin.

15) In his monograph (Casper 1966) he never told that he was in a critical personal situation when 'finishing' his work. However, that cannot excuse his erroneous judgement.

calcareous ground. An exception seems to be the locality Il Paduli presso Fociomboli (Del Prete & Tomaselli 1982: 354 [16]). It is somewhat a marshy site in an altitude near 1100 m situated above a former glacial lake north of M^te^ Corchia distinguished by a moisture-loving (hygrophilous) vegetation. Here, *P. apuana* grows together with *Equisetum palustre, Ophioglossum vulgatum,* and *Parnassia palustris*.

In a specimen from Pania della Croce we observed a nearly spur-less ('*norica*') corolla: nearest to the axis ('proxime') the tube ends abruptly obtuse.

Discussion and conclusions

I. *Pinguicula mariae*

When he saw the beautiful *Pinguicula* in the Torrite Secca Valley near Isola Santa for the first time, Casper was convinced that it would represent a new species. Without any hesitation he named it *P. mariae* being aware of some similarities to *P. poldinii* Steiger et Casper from the subalpine mountains east of the Dolomites (Friuli-Venezia Giulia)[17]. The species remembered *P. reichenbachiana* J. Schindl. from the Alps Maritime, too. Nevertheless, the foliage differs to a high degree. Later on, when having studied the chromosome number, we learned that the three species are tetraploids, i.e., they have diploid 2n = 32 chromosomes like *P. grandiflora, P. leptoceras, P. balcanica*, and the members of the *P. longifolia* group (Casper & Stimper 2009).

Indeed, the relations to *P. poldinii* and *P. reichenbachiana*, respectively, are obvious. The colour of the corolla is a shining blue to blue-violet with a white in outline drop-like spot on the middle lobe of the lower lip. The corolla is widely open, i.e., the two erect nearly identical lobes of the upper lip form with the three ones of the lower lip bended downwards an opening angle of about ~ 120°–180°; the middle lobe of the lower lip is distinctly longer and broader than the lateral lobes. As a rule the lobes do not cover one another. The tube is short and broadly funnel-shaped, and the spur is straight and comparably long, nearly as long as the corolla lip.

In *P. mariae*, the white, in its outline more or less drop-like spot on the middle lobe of the corolla lower lip is a striking feature (Plate 9, Fig. 4); the two lateral lobes are at most free from such a hairy spot. In *P. poldinii*, the two lateral lobes are whitely spotted, the whole whitish basal region of the corolla lower lip lobes is interrupted by longitudinal violet veins forming a characteristic striated pattern. In *P. reichenbachiana*, the basal (proximal) sections of the three lower lip lobes are more or less uniformly whitish spotted. From this features it becomes clear that the differences between the three species are small but distinct.

In all three species the calyx is very variably structured. The upper lip consists of three obovate to acute lobes normally divided to ⅙–½ of its length; the lower lip is divided into two short or long lobes of obviously different form. There can be stout calyces with very short lobes apically rounded and only shallowly divided (Plate 10, Figs 1–2, 5–6). In other cases the lobes are long and narrow, at the apex acute and widely spreading, the lobes of the lower lip forming an angle of about 90° (Plate 10, Figs 7–8). Finally, the number of lobes can be enlarged: instead of normally five lobes we counted six to eight lobes resulting in an abnormal appearance of the calyx. The

16) By the authors, the specimens are determined as *P. vulgaris*.

17) In the meantime *P. poldinii* has been found in Val di Capra, Val dell' Olier (Prov. Vicenza) and Covoli di Val di Lamen (Prov. Belluno) by C. Argenti (Belluno, pers. comm.; vouchers in herb. Argenti, Belluno, duplicates in JE).

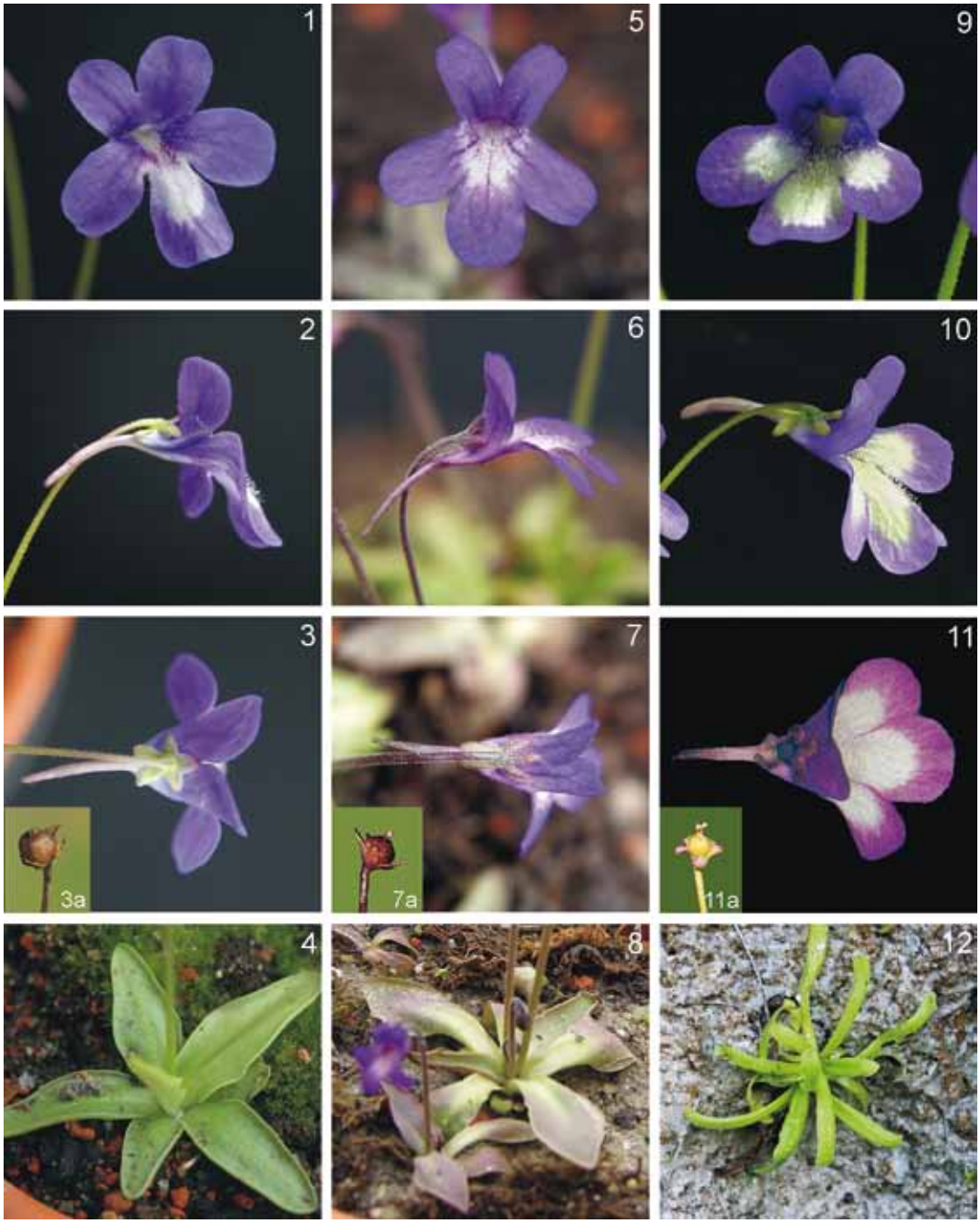

Plate 9. Comparison of corollas and foliages. Figs 1–4: *P. mariae* Isola Santa: cult. BGJ 74.1, Figs 5–8: *P. poldinii* San Francesco; cult.; Figs 9–12: *P. reichenbachiana* Roya Valley; cult. (Figs 9–10, 12: M. Welge; Figs 11, 11a: J. Steiger). Figs 1, 5, 9 corolla front view; Figs 2, 6, 10 corolla side view, note the comparably long spur; Figs 3, 7, 11 corolla dorsal side, see the different calyx structure; Figs 3a, 7a, 11a capsules (sub-)globose (~ 5 mm in diam.). Figs 4, 8, 12 foliage; see in Fig. 12 the *longifolia*-leaves. – Preparation and photographs: R. Stimper.

different forms can be observed in the same population. In *P. poldinii*, the long and narrow lobes are dominating (Plate 10, Figs 9–12); at apex they are often shallowly incised and appear two- to three-tipped (Plate 10, Figs 11–12).

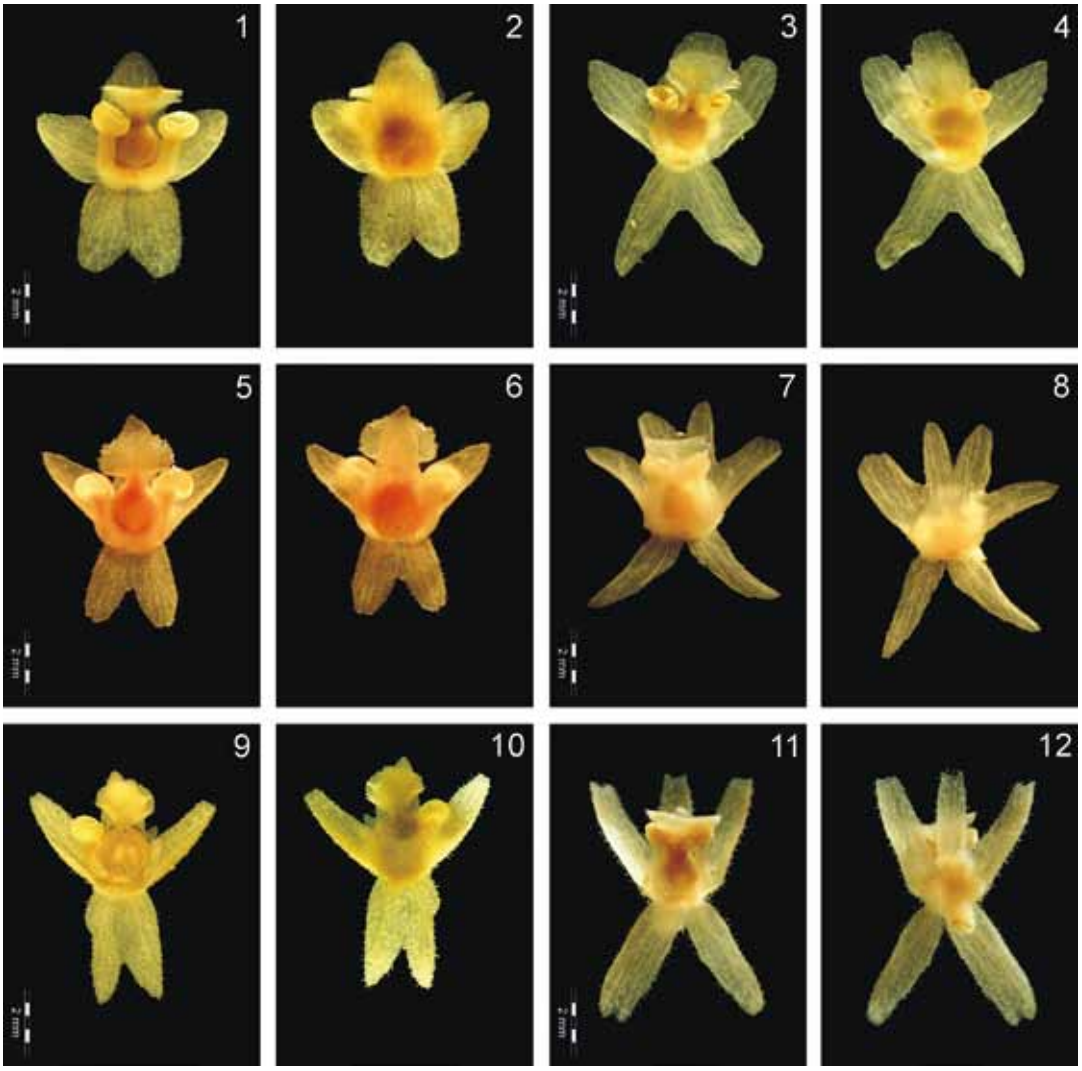

Plate 10. Calyces. Stereomicrophotographs. Figs 1–4: *P. reichenbachiana* – St 23 (Roya Valley, cult.); Figs 5–8: *P. mariae* – Toritte, Isola Santa BGJ 74.1; Figs 9–12: *P. poldinii* (Figs 9–10 San Francesco (cult. JE), Figs 11–12 St 29). All figures of the same population, arranged in pairs; left: ventral (inside), right dorsal (outside) view. – Preparation and photographs: R. Stimper.

In *P. mariae* and in *P. poldinii*, the rosulate foliage is homophyllous, i.e., there are no morphologically different spring and summer leaves; they all appear more or less uniform. The few leaves are lying flat on the rocky ground; in outline they are obovate-oblong, obtuse at the apex, narrowed into the base and about 2–4 × as long as broad. In *P. reichenbachiana*, the rosulate foliage is more or less heterophyllous, i.e., the prefloral leaves are shorter than the postfloral leaves; the latter are 3–6 × as long as broad, in their appearance tape-like remembering the *longifolia*-type of foliage (Plate 10, Fig. 12).

Ferrarini (1967: 351, ril. n. 74) reported *P. vulgaris* var. *leptoceras* from the limestone walls of M^te^ Nona in about 1000 m asl. However, the population represents nothing else than our *P. mariae*.

As we have shown earlier, their specific stands remember the localities colonized by the *Adiantetea*-communities described and denominated *Coeno-Pinguiculion* by Deil (1989): They are growing in rock cavities or on steep rocks rich in limestone with dripping water ('Felsstirn-Halbhöhlen-Catena'). This 'Balmenflora' is known from the northern Mediterranean. Their members should be thought as highly (paleo-) endemic vicarious species. Our map (Fig. 5) shows the distribution of *P. mariae* and *P. apuana* in the Apuan Alps based on own collections, vouchers found in various herbaria and reports in literature (cf. paragraphs specimina visa) checked by us.

Identification key to *Pinguicula reichenbachiana, P. poldinii,* and *P. mariae*

1 Foliage more or less heterophyllous, during fruiting leaves 'longifol'; calyx very variable, the three upper lip lobes broadly short at tip more or less obtuse, the two lower lip lobes often spreading; corolla lower lip lobes at most covering one another, each lobe with one white hairy spot on the proximal part; occurring in the Alps Maritime (Roya-Valley) and perhaps in Liguria (Castelvecchio, Rocca Berbena; Zuccarello, Rio Auzza; springs of Rio Iba) ..... *P. reichenbachiana* J. Schindl.

– Foliage homophyllous, not heterophyllous, during fruiting leaves not 'longifol'; calyx very variable; corolla lower lip lobes not or rarely covering, with one distinct white hairy spot restricted to the proximal part of the middle lobe; lateral lobes not or very scarcely white spotted 2

2 Corolla lower lip with one distinct white hairy spot restricted to the proximal part of the middle lobe; the spot longitudinally violet veined; lateral lobes not or very scarcely white spotted; the three calyx upper lip lobes narrowly long, at the tip denticulate or slightly emarginated, lower lip lobes quite similar, often spreading; occurring in the hilly lands of prov. Vicenza and, Belluno, and in Friuli ..... *P. poldinii* Steiger et Casper

– Corolla lower lip with one distinct hairy spot restricted to the proximal part of the middle lobe, the spot in outline drop-like; the three calyx upper lip lobes more or less triangular, the middle lobe often divided in two or more lobes, the two lower lip lobes similar or deeply divided and then spreading, all of the calyx lobes at the tip not denticulate or emarginated; occurring in the Apuan Alps between ~ 250 m and ~ 1000 m ..... *P. mariae* Casper

II. *Pinguicula apuana*

The *P. apuana* sites in the Apuan Alps are quite different to those of *P.* cf. *vulgaris*[18] in the neighbouring mountains of Appennino Tosco-Emiliano or Appennino Emilio-Romagna[19]. While the latter localities are acid humid mountainous-subalpine meadows or peat-bogs quite

18) These populations might well be members of the vicarious chain of taxa that starts in the Abruzzo mountains stretches into northwestern direction across the higher parts od the Apennines to Liguria.

19) Such sites are for example: Lamarossa (Parco dell' Orecchiella); Le Lamacce; Abetone, Boscolungo (~ 1400 m); Libro Aperto, Lago della Risaia (~ 1600 m); Lago Nero (Alpe Tre Potenze), ~ 1700 m); Foce della Verginetta (~ 1500 m); Lago di Baccio (~ 1600 m); Lago Torbido-Lago Turchino-Lago Santo (~ 1550–1600 m); Val di Luce (~ 1600 m); Valle del Sestaione ~ 1600 m); M^te^ Acuto (Lago di M^te^ Acuto ~ 1700 m); Alpe di Succiso (~ 2000 m); M^te^ Alto, Prataccio (Sorgenti del Secchia, ~ 1500 m). Our *Pinguicula* often grows together with *Eriophorum latifolium, Caltha palustris, Vaccinium myrtillus, V. uliginosum*, and *V. vitis-idaea.* For the occurrence of *Pinguicula* in the Emilia Romagna see the reports on flora and vegetation by Bassi (in Brugnara & Zannoner 1998: 107, 109, as *P. vulgaris*), by Alessandrini & Bonafede (1996: 255, as *P. vulgaris*), and by Alessandrini & Branchetti (1997: 176, as *P. vulgaris*), too.

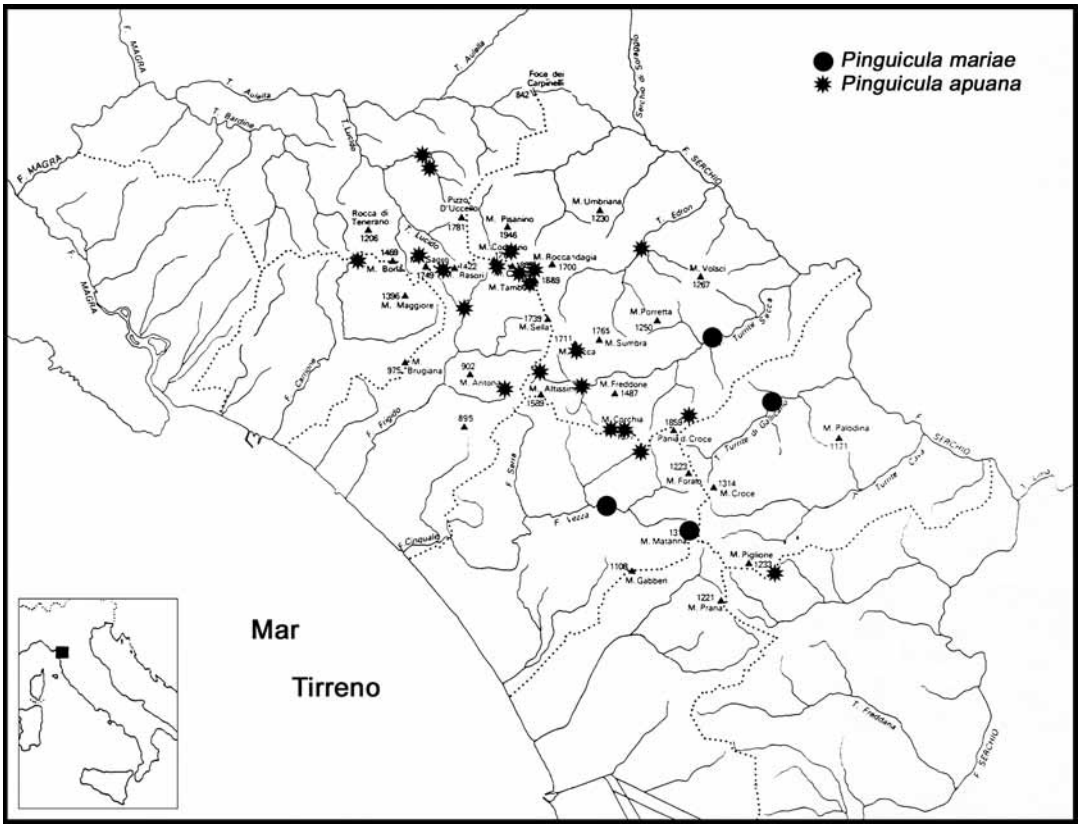

Figure 5. Map of distribution of *P. mariae* (●) and *P. apuana* (∗) in the Apuan Alps (having used as base map the 'Carta della regione Apuana' in Ferrarini; modified).

similar to the relic ones in central and northern Europe formed in connection with the quaternari glaciations, the Apuan stands are on basic soils (limestone, marble), especially at rocks or slopes. Typical localities are found at the perpendicular rock walls near the Spinning mill ('Filanda') at the northern end of Forno (MS-River Frigido valley) and the vertical rocks along the street at Campagrina (Tre Fiumi-LU) or in limestone (marble) cree on the western slopes of M^te^ Corchia or on calcareous-marble slopes along the street near Lago di Vagli.[20] The all-over characteristics of these stands remember to a certain degree the *P. mariae* localities.

Ferrarini reported *P. vulgaris* var. *leptoceras* or *P. vulgaris*, respectively, from localities as the mountain path between Foce del Faneletto to Foce del Pollaro NE of M^te^ Sagro (~ 1400 m, above Lias limestone, 1400 m (Ferrarini 1966: 542, ril. n. 2); NW of M^te^ Sagro, above mesozoic limestone (Ferrarini 1966: 543, ril. n. 3); Cresta del Garnerone fino al M^te^ Grondilice (Ferrarini 1966: 555, ril. n. 9, as *P. vulgaris*); SW of M^te^ Grondilice, ~ 1805 m (Ferrarini 1966: 556, ril. n. 10, as *P. vulgaris*); N of M^te^ Grondilice, ~ 1805 m (Ferrarini 1966: 557, ril. 11); M^te^ Cavallo, on calcareous rocks, towards N alla Foce del Cardeto (Ferrarini 1966: 566, ril. n. 14); N of Pisanino, on rocks (quartz, no limestone!), ~ 1940 m (Ferrarini 1966: 585, ril. n. 29); N of

20) In Di Fazio et al. (2004, Fig. 15, and on p. 169 – photographs –, and on p. 168 – drawing – named *P. reichenbachiana*) *P. apuana* is figured on natural sites together with *Valeriana montana, Saxifraga rotundifolia, S. aizoides,* and *Carex ferruginea* subsp. *macrostachys.*

Tambura, marble rocks, ~ 1600 m (Ferrarini 1966: 590: ril. n. 32); M^te^ Altissimo al Passo degli Uncini, ~ 1400–1600 m (Ferrarini 1966: 599, ril. n. 37); N of M^te^ Fiocca, on limestone, ~ 1700 m (Ferrarini 1967: 306, ril. n. 45); Torrioni del Corchia near Fociomboli, on dolomite, ~ 1500 m (Ferrarini 1967: 325, ril. n. 53). There is no doubt that these sites correspond well to our own findings (and the old ones by Bertoloni, too). The populations growing there are nothing else than *P. apuana.*[21]

The *Pinguicula* populations in the peat-bog 'I Paduli' near Fociomboli, in an altitude of ~ 1100 m N of M^te^ Corchia (Del Prete & Tomaselli 1981: 354, as *P. vulgaris*) have to be investigated newly with respect to the geological nature of its site (acid or basic?).

The vertical distribution is remarkable. It reaches from about 300 m in River Frigido valley at steep rocks near the former Spinning mill ('Filanda') of Forno up to about 1950 m.

In future it should be checked whether the *P. apuana*-populations in the Apuan Alps are comparable directly to those ones in southeastern Apennines as we suppose. The species or subspecies described from the latter area – *P. fiorii* Tammaro et Pace, *P. vallis-regiae* F. Conti et Peruzzi, *P. vulgaris* subsp. *anzalonei* Peruzzi et Conti, *P. vulgaris* subsp. *vestina* F. Conti et Peruzzi, and *P. vulgaris* subsp. *ernica* Peruzzi et F. Conti – are growing on basic substrates (Conti & Peruzzi 2006) and, as far as we know, they are taxa with an octoploid chromosome complement (2n = 64, rarely and accidentically hexadecaploid with 2n = 128 chromosomes; Caparelli et al. 2008, Casper & Stimper 2009). Perhaps these 'microspecies' form a vicarious chain of *Pinguicula* taxa that originated independently from the *P. vulgaris* populations in the Alps north of the River Po plain and in the level and mountainous lands of central and northern Europe.

However, and what's about the *P. vulgaris*-like populations on acid grounds of the higher parts of the northern Apennines between Tuscany and Liguria? Their taxonomic state and their relationship should be proved with special attention to the Apuan *P. apuana* populations.

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Abbreviations:

SEM	Scanning electron microscope
BGJ	Botanical Garden Jena
St	Collection Jürg Steiger, Bern-Kreuzberg (Switzerland)

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