

NEW ADDITIONS TO THE GENUS *PINGUICULA* (LENTIBULARIACEAE)
OF MEXICO

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ABSTRACT

Two new species of *Pinguicula* from México are described and illustrated: *P. stolonifera* (subgen. *Pinguicula*) from the state of Oaxaca, and *P. laxifolia* (subgen. *Pinguicula*) from the state of Tamaulipas. *Pinguicula stolonifera* belongs to the section *Orcheosanthus*, and subssect *Caudatopsis*. A new section (*Orchidoideae*) is proposed to include *P. laxifolia*. The taxonomic status of *P. jorgehinonii* B.L. Turner, *P. hintoniorum* B.L. Turner, and *P. reticulata* Schläuer is discussed. They are considered to be synonymous with previously described species.

KEY WORDS: Lentibulariaceae, *Pinguicula*, Flora of México, systematics

Research on the extensive herbarium collections of the genus *Pinguicula*, from the University of Texas, has revealed the following results.

Pinguicula stolonifera Luhrs, spec. nov. (Figure 1). TYPE: MEXICO. Oaxaca: ca. 3 km. se. of Ixtlán de Juárez, on steep banks in pine and oak woods, ca. 2300-2400 m, 14 Aug. 1966, R.W. Cruden 1177 (HOLOTYPE: TEX1 271238); sub nomine *P. oblongiloba* DC. Det.: S. Zamudio 1989.

Herba perennis, stolonifera; stolones flagelliformis, cerasini, usque ad 8 cm longis. Rhizoma simplex brevis, radicibus adventitiis numerosis funiformibus. Folia radicalia rosulata, bifurcata; rosula "hiemis" numerosa - 36, crassa, ovata vel lanceolata, acuta, 4-7(-12) mm longa, 1-3 mm lata, facie concava; rosula "aestatis" 4-7, distincte petiolata, petiolo erecto, 11-18 mm longo, 2-3 mm lato, margine ciliato, lamina lanceolata vel anguste oblongo-ovata, acuta, basin versus angustata, margine provunde involuta, supremae glandulis sessilibus et glandulis stipitatis dense vestita, 18-33 mm longa, 6-12 mm lata. Hibernacula nulla; gemmatae. Pedicelli 1-3 erecti, cerasini, apicem versus glandulis stipitatis disperse obsiti, 105-164 mm alti, uniflori. Flores 39-51 mm longi (calcarii incluso). Calyx bilabiatus, exius glandulis stipitatis

obtusis; labium superum trilobum, lobis anguste ovatis, 3 mm longis, 2 mm latis; labium inferum usque ad dimidium longitudinis bilobum, lobis ovatis, 2.5 mm longis, 1 mm latis. Corolla ringens, profunde bilabiata, magenta, labio infero ad basi striata alba ornato, exius glandulis stipitatis vestita; labium superum bilobum, lobis oblongo-ovatis, 10-14 mm longis, 5-9 mm latis; labium inferum profunde tripartitum, lobis lateralibus oblongo-lanceolatis, apicem versus angustatis, 11-16 mm longis, 4-7 mm latis, lobo inferomedio paulo major 15-19 mm longo, 4-5 mm lato. Tubus brevissimus infundibuliformis, 3-4 mm longus, intus pilosus, pili cylindrico-subulatis, sine palato. Calcar cylindrico-acuminatum, sinuatum, 18-26 mm longum, cerasinum. Ovarium subglobosum, glandulis stipitatis obsitum. Stigma bilabiatum, purpureum, labio infero maximo, suborbiculate, fimbriato. Capsula ovoidea, ± 4 mm longa, glandulis stipitatis parum obsita. Florescentia VIII-IX.

Perennial herb, stoloniferous; stolons whip-like, cherry-red, up to 8 cm long, bearing up to 4 non glandular leaves (2-4[-6] mm long) along its length. Stem short, with numerous adventitious fibrous roots. Leaves rosulate, dimorphic; the leaves of the winter rosette numerous - 36, thick, ovate or lanceolate, acute, 4-7(-12) mm long, 1-3 mm wide, concave; the leaves of the summer rosette 4-7, with a distinct petiole, erect, 11-18 mm long, 2-3 mm wide, margin ciliate, lamina lanceolate or narrowly oblong-ovate, acute, narrowing towards the base, margin deeply involute, the upper surface densely covered with sessile and stipitate glands, 18-33 mm long, 6-12 mm wide. Hibernaculum absent; provided with gemma-like buds. Scapes 1-3, erect, cherry-red, the upper part dispersedly stipitate glandular, 105-164 mm tall, 1-flowered. Flowers 39-51 mm long, including the spur. Calyx bilabiata, stipitate glandular; upper lip 3-lobed, the lobes narrowly ovate, 3 mm long, 2 mm wide; lower lip divided to the middle into 2 lobes, the lobes ovate, 2.5 mm long, 1 mm wide. Corolla deeply bilabiata, red-purple, the base of the lower lip marked with a white vertical streak, the outer surface stipitate glandular; upper lip 2-lobed, the lobes oblong-ovate, 10-14 mm long, 5-9 mm wide; lower lip deeply 3-lobed, the lateral lobes oblong-lanceolate, narrowing towards the apex, 11-16 mm long, 4-7 mm wide, the middle lobe slightly larger, 15-19 mm long, 4-5 mm wide. Tube extremely short, funnel-shaped, 3-4 mm long, with cylindrical-subulate hairs inside, palate absent. Spur cylindrical-acuminate, 18-26 mm long, cherry-red. Ovary subglobular, stipitate glandular. Stigma bilabiata, purple, the lower lip much larger, suborbiculate, margin fimbriate. Capsule ovoid, ± 4 mm long, slightly stipitate glandular. Florescence August-September.

ADDITIONAL MATERIAL EXAMINED: MEXICO. Oaxaca: Distr. Ixtlán, Sierra de Juárez, ne. of C. Pelón, on a steep loamy bank, ± 2700 m, 29 Sep. 1991, Luhrs et al. 9105 (Herb. Luhrs); In umbrosis Totontepeque, Harweg 509 (L).

Pinguicula stolonifera belongs to the section *Orcheosanthus* because of the deeply bilabiata corolla, the extremely short funnel-shaped tube, and the very large spur. Within this it is placed in the subssect *Caudatopsis*, together with *P. macrophylla* H.B.K. and *P. oblongiloba* DC., because of the lanceolate or broadly ovate, acute or acuminate winter leaves, and long petiolate summer leaves as defined in Casper's monograph of the genus *Pinguicula* (1966a). It shows some affinity with *P.*

oblongiloba, especially on behalf of the corolla lobes (Hinton et al. 14504 [TEX]). Although it has been identified with *P. oblongiloba* by S. Zamudio, it differs from the latter by having much shorter, narrower, and deeply involute summer leaves, and by forming gemma-like buds, putting forth long whip-like runners, budding at the end of its tip, a feature which is unique in the Mexican pingüiculas and is known (in a much shorter stolon-like manner) in *P. calyptrata* H.B.K. from Ecuador, and *P. valleriifolia* Webb from Spain. Unfortunately these differences are not easily observed when the plants are dried, resulting in difficult identification of the herbarium material, especially when plants are poorly pressed. However, field study confirms such identification, as both species have been observed by the author in their natural habitats. Other characteristics are:

	<i>P. stolonifera</i>	<i>P. oblongiloba</i>
Winter leaf	ovate or lanceolate, acute, 4-7(-12) mm L./ 1-3 mm W.	lanceolate, acute, 8-12 (-15) mm L./ 2-3(-5) mm W.
Lamina of the summer leaf	lanceolate or narrow, ovate-oblong, acute, 18-33 mm L./ 6-12 mm W.	oblong or spatulate-rotate, 23-65 mm L./ 10-42 mm W.
Petiole	11-18 mm L.	12-23 mm L.
Scape	apex dispersedly stipitate glandular, 105-164 mm L.	densely stipitate glandular, (60-)80-130(-154) mm L.
Corolla	red-purple	purple-violet
Inferior lobes	oblong-lanceolate, 11-19 mm L./ 4-7 mm W.	oblong-lanceolate or oblong-obovate, 9-13 mm L./ 5-8 mm W.
Spur	sinuate, 18-26 mm L.	incurved, (13-)18-23(-26) mm L.

Pinguicula stolonifera is known from the southern slopes of the Sierra de Juárez, Oaxaca, where it inhabits cool and moist banks in mixed oak and pine woods at altitudes between 2300 and 2700 m.

Pinguicula laxifolia Luhrs, spec. nov. (Figure 2). TYPE: MEXICO. Tamaulipas: Distr. Gómez Farfás, Rancho del Cielo, between La Perra and Agua Linda, small plants with pink flowers, 31 Mar 1969, A. Richardson 1211 (HOLOTYPE: TEX1).

Herba perennis. Rhizoma simplex brevis, radicibus adventitiis filiformibus numerosis. Folia radicalia rosulata, bifurcata; rosula "hiemis" numerosa -17, obovato-spathulata, subpetiolata, 10-17 mm longa, 1.5-3.5(-5.0) mm lata; rosula "aestatis" semiterecta, erecto-patens dissimilata, elliptica vel oblanceolata, basin versus in longe petiolum ad $\pm 1/3$ longitudinis angustata, apicem versus margine parum involuta, superne glandulis sessilibus et

glandulis stipitatis dense vestita. (32-)40-68 mm longa, (4-)6-12 mm lata. Hibernacula nulla. Pedicelli 1-3 (vel plures?) erecti, glandulis stipitatis obsiti, 60-93 mm alti, uniflori. Flores 30-39 mm longi (calcarii inclusos). Calyx bilabiatus, extus glandulis stipitatis obsitus; labium superum trilobum, lobis oblongis, ± 2 mm longis, 1.5 mm latis; labium inferum bilobum, lobis elliptico-oblongis, ± 1 mm longis, 1 mm latis. Corolla bilabiata, rosea vel pallide violacea, in fauce albidata, stria et macula violacea; labium superum inferum, lobis late obovato-cuneatis, 8-9 mm longis, 6-8 mm latis; labium inferum trilobum, basi pilosis luteis, pilis longis cylindricis disperse vestitis, lobis lateralibus obovatis vel obovato-rotundatis, 9-10 mm longis, 7-9 mm latis, lobo intermedio obovato vel suborbiculato, usque ad 13 mm longo et 11 mm lato. Tubus brevis late funambuliformis, 6-8 mm longus, 4-5 mm latus, sine palato, intus pilosus, pilis longis cylindricis disperse vestitus. Calcar cylindricum-acuminatum, subrectum, 10-14(-17) mm longum, cum tubo angulum subrectum formans. Capsula subglobosa, ± 3 mm longa. Florescentia (II)-III-(?).

Perennial herb. Stem short, with numerous adventitious thread-like roots. Leaves rosulate, dimorphic; the leaves of the winter rosette numerous -17, obovate-spatulate, subpetiolate, 10-17 mm long, 1.5-3.5(-5.0) mm wide; the leaves of the summer rosette semi-erect, spreading at different angles, elliptic or oblanceolate, narrowing towards the base into a long petiole about 1/3 of its length, the margin towards the apex lightly involute, the upper surface densely covered with sessile and stipitate glands, (32-)40-68 mm long, (4-)6-12 mm wide. Hibernaculum absent. Scares 1-3 (or more?), erect, stipitate glandular, 60-93 mm tall, 1-flowered. Flowers 30-39 mm long, including the spur. Calyx bilabiate, stipitate glandular; upper lip 3-lobed, the lobes oblong, ± 2 mm long, 1.5 mm wide; lower lip 2-lobed, the lobes elliptic-oblong, ± 1 mm long, 1 mm wide. Corolla bilabiate, pink or pale violet, the throat white, with darker violet markings; upper lip 2-lobed, the lobes broadly obovate-cuneate, 8-9 mm long, 6-8 mm wide; lower lip 3-lobed, the base broadly obovate with long cylindrical hairs, being yellow in the center of the throat, the lateral lobes obovate or obovate-rotundate, 9-10 mm long, 7-9 mm wide, the middle lobe obovate or suborbiculate, up to 13 mm long and 11 mm wide. Tube short, broadly funnel-shaped, 6-8 mm long, 4-5 mm wide, palate absent, the inside scattered with long cylindrical hairs. Spur cylindrical-acuminata, more or less straight, 10-14(-17) mm long, forming an almost straight angle with the tube. Capsule subglobular, ± 3 mm long. Florescence (February)-March-(?)

This species occurs between 6300 and 6800 ft. in the high mountains of the Gómez Farfás area. Although the distribution of this plant appears to be very restricted, further details of habitat and geographical range are unknown.

Pinguicula laxifolia clearly belongs to the subgen. *Pinguicula* because of its bilabiate corolla, distinct funnel-shaped tube, and the spur which is longer than the tube without being contracted from it. Within this it is closely related to the sections *Orleasantulus* and *Pinguicula*. From the latter it is distinguished because of the dimorphic leaves, the absence of a hibernaculum, and the somewhat larger tube. From the section *Orleasantulus* it is distinguished because of the bilabiate corolla, the

does being almost twice as long as the tube, and the spur formed in an almost straight angle with the tube about twice its length.

The existence of this new species, which cannot satisfactorily be placed in either of the sections mentioned above, necessitates the erection of a new section within the subgen. *Pinguicula*, named after the likeness with members of the Orchid family, and close relationship to the section *Orchidoanthus*.

Pinguicula sectio *Orchidothoides* Lührs, *sect. nov.*

Folia bifurcata, hibernaculis nullis; corolla bilabiata, lobis tubum ± duplo superantibus; tubus brevis, late infundibuliformis; calcar longiusculus, tubum ± duplo superans.

Leaves dimorphic, without hibernaculum; corolla bilabiate, the lobes about twice the length of the tube; tube short, broadly funnel-shaped; spur moderately long, about twice the length of the tube.

Type species: *Pinguicula laxifolia* Lührs.

In view of the fact that most species of *Pinguicula* show a degree of variation in size, figure, and color of the floral parts, the following species, due to their close resemblance to previously described taxa, are considered to be synonymous.

Pinguicula jorgehintonii B.L. Turner and *P. hintoniorum* B.L. Turner (Turner 1994), were thought to be related to *P. essertiana* Kirchner of the section *Crassifolia*. *Pinguicula jorgehintonii* is clearly related to the section *Heterophyllum*, because of the corolla with equal lobes, the cylindrical tube, and the short spur being well contracted from the tube. Within this it shows identical features with *P. rotundiflora* Studnicka (1985) of the subject *Isotobopsis*. According to the description and the herbarium specimens accompanied by numerous photographs (Hinton *et al.* 24000 [HOLOTYPE: TEX]), the two types of leaves described are actually decayed late-summer leaves, and those who form the winter rosette of which the plant flowers. These are identical with the leaves of *P. rotundiflora* which flowers at the same time. The numerous capitate hairs on the orifice of the throat and inside the tube occur in both species. Because of the identical features alluded to, *P. jorgehintonii* is regarded as a synonym of *P. rotundiflora*. The obvious resemblances of the inflorescence of both species are found in Table 1.

Pinguicula hintoniorum is related to *P. essertiana* and belongs to the section *Crassifolia*, mainly because of the numerous succulent leaves, forming a tight rosette like those of a *Sempevivum*, a feature which cannot be observed in dried material. According to the herbarium specimens and the photographs accompanied (Hinton *et al.* 22661 [HOLOTYPE: TEX]), it is clearly identical to *P. elhersae* Speta & Fuchs (1982), a species which has been observed by the author both in the field and in culture. *Pinguicula hintoniorum* is regarded as synonymous with *P. elhersae*, because bilabiate corolla, purple or mauve in color, the nearly glabrous scapes, the deeply lobes, the short funnel-shaped tube, and the long glabrous spur.

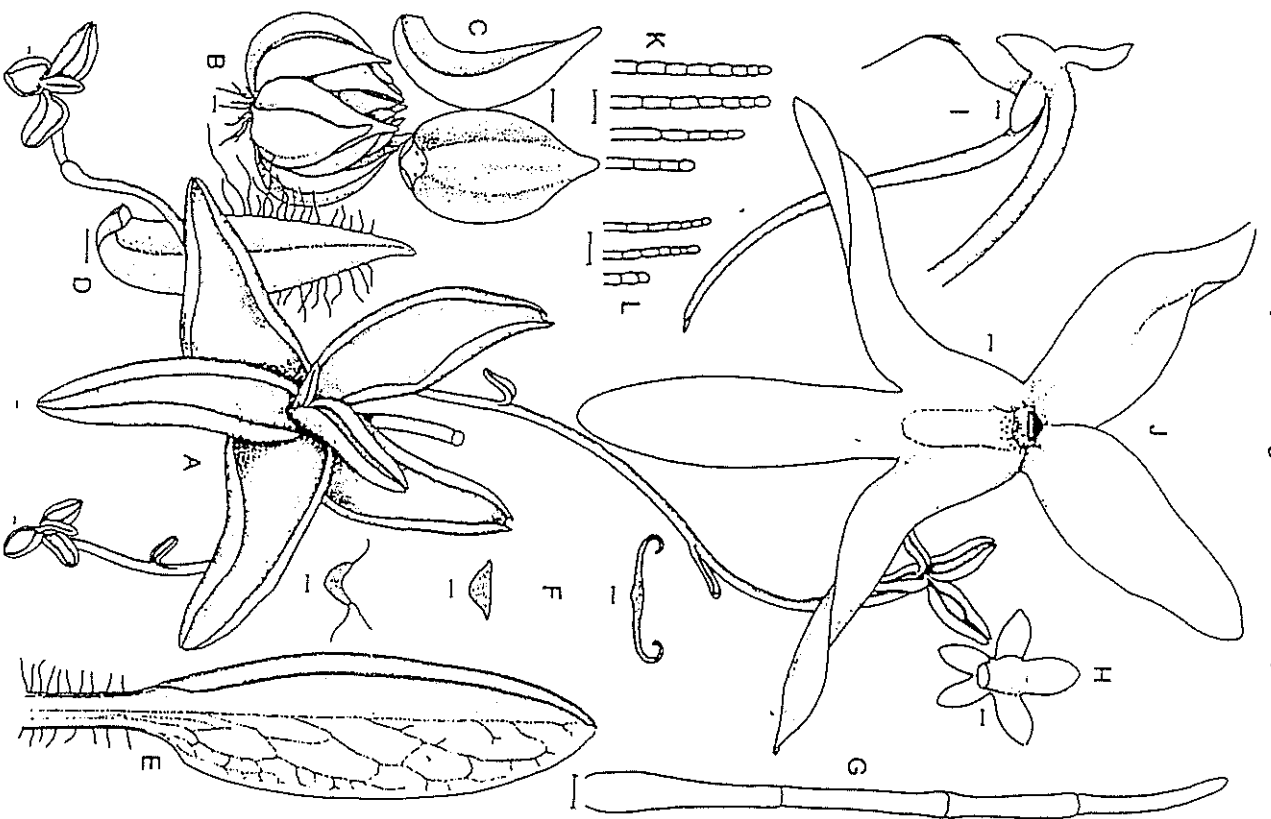


Figure 1. *Pinguicula stolonifera*. A. summer rosette with stolons; B. winter rosette; C. winter leaf, with lateral view; D. outer winter leaf; E, F, G. lamina and petiole of the summer leaf, with transverse sections, and margin hair of the petiole; H. calyx; I. calyx and spur, lateral view; J. corolla; K. corolla tube hairs; L. hairs from the upper region of the spur. Scale bars A-F, H-J 1 mm; G, K, L 0.1 mm.

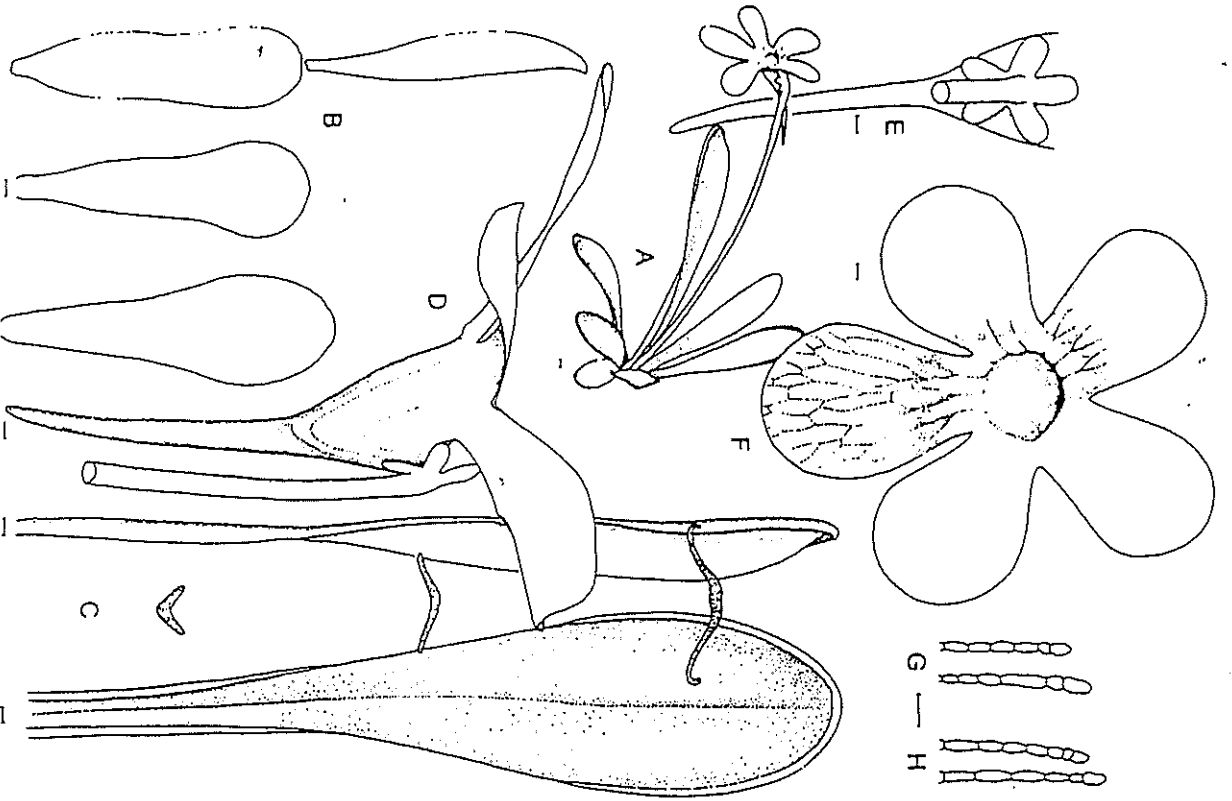


Figure 2. *Pinguicula laxifolia*. A. Flowering plant; B. winter leaves, with lateral view; C. summer leaf, with lateral view, and transverse sections; D. flower, lateral view; E. calyx and spur; F. corolla; G. corolla throat hairs; H. corolla tube hairs. Scale bars A-H 1 mm; G, H 0.1 mm.

Table 1. Comparison of inflorescence features between *Pinguicula jorgehinonii* and *P. rotundifolia*.

	<i>P. jorgehinonii</i>	<i>P. rotundifolia</i>
Scape	glabrous, 30-60 mm L.	glabrous, 20-75 mm L.
Corolla lobes	pink or pale purple, obovate or cuneate, 5-8 mm L./5-8 mm W.	pale purple, obovate, oblong or cuneate, 5-9 mm L./4-9 mm W.
Tube	cylindrical, ± 8 mm L./6 mm W.	cylindrical, 5-9 mm L./4-7 mm W.
Spur	short, 5-8 mm L.	short, 4-7 mm L.

Another species, *Pinguicula reticulata* Schlauer (1991), shows a remarkable resemblance with *P. kondoi* Casper (1974), both belonging to the section *Heterophyllum* and subsect. *Isotobopsis*. *Pinguicula reticulata* was thought to be different from *P. kondoi* because of the longer flower scapes, the truncate or somewhat emarginate calyx lobes, and the purple-veined corolla lobes. From habit observations, the average length of the flower scapes is equal to those of *P. kondoi*; the calyx lobes are not always truncate or emarginate but also obtuse, and the veining of the corolla lobes is not always visible, in white as well as in pale purple corollas. Herbarium specimens of *P. reticulata* (Hinton et al. 21936, 22700, 22716 [TEX]) show similar features with those of *P. kondoi* (Hinton et al. 19021 [TEX]), and according to the latter's description, the photograph of the holotype (Kondo 1029 [NCU 381921]) clearly indicates dark venation in the corolla lobes, a feature that somehow must have been overlooked by the author. The most obvious resemblances of the inflorescence are:

	<i>P. reticulata</i>	<i>P. kondoi</i>
Scape	stipulate glandular, 30-65 (-90) mm L.	stipulate glandular, 30-65 mm L.
Calyx lobes	oblong or spatulate, emarginate or obtuse	oblong-spatulate, obtuse
Corolla lobes	suborbiculate, truncate, emarginate or obtuse	suborbiculate, truncate, 4-5 mm L./4-5 mm W.
Tube	8 mm L./3-4 mm W.	8 mm L./3-4 mm W.
Spur	± 4 mm L.	3.5-4.5 mm L.

Despite its name, *Pinguicula reticulata* must be regarded as a synonym of *P. kondoi*, due to the identical features discussed.

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