

## Eight New Species and Four Newly Found Species of *Pedicularis* (Scrophulariaceae) from Bhutan

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Mr. and Mrs. Miede of Georg-Augst University, Göttingen visited Bhutan from July to September 2000 and collected many specimens of *Pedicularis* (Scrophulariaceae). They kindly entrusted me the study of these specimens. Among the materials eight new species and four species newly found in Bhutan are described here.

**Key words:** Bhutan, new species, *Pedicularis*, taxonomy.

1. ***Pedicularis bhutanomuscoides*** Yamazaki, sp. nov. (Ser. Flameae Prain) [Figs. 1a, 3a]

Herba perennis, cum floribus 3–6 cm alta. Rhizoma breve crassum, radices paucas emittentes, collo squamato, squamis membranaceis oblongis acutis integris. Caulis breves simplex, 1.5–2 cm longus, lanatus. Folia alterna, plerunque basalia, petioles 8–20 mm longis pilosis, laminis oblongo-linearibus, 1.5–4.5 cm longis 4–10 mm latis, utrinque glabris, pinnatisectis, segmentis 7–20 jugis oblongis obtusis, obtuse serratis. Flores in calycem superiorum fasciculati, capitato-spiciformes. Bractee minute foliiformae, dense lanatae. Pedicelli 1–2 mm longi. Calyx late tuberosus, ca. 10 mm longus 4 mm latus, apice 5-lobatus, lobo postico setaceo acuto, ca. 1 mm longo, lobis lateralibus orbiculato-ovatis stipitatis, ca. 2 mm longis et latis. Corolla lutea, apex cinereo-fusca, tubo recto, ca. 12 mm longo 4 mm lato, glabro, galeo recto, dorso leviter curvato, ca. 10 mm longo 4 mm lato, labio inferiore ca. 7 mm longo 10 mm lato, margine glabro, 3-lobato, lobis lateralibus orbiculatis, ca. 5 mm longis et latis, lobo medio orbiculato, ca. 2.5 mm longo et lato.

Stamina, filamentis omnibus glabris. Capula ignota.

Hab. Bhutan. Paro Distr. Bunte La 4930 m. Open *Rhododendron anthopogon* dwarf-scrub with mat fragment on under N-facing slope (G. & S. Miede, Jul. 10, 2000, 00-184-07. Holotypus TI, 00-183-11 Paratypus Georg-Augst Univ., Göttingen, TI).

This species resembles *P. muscoides* Li subsp. *himalayca* Yamazaki, but differs by the larger and more serrate leaves and larger flowers.

2. ***Pedicularis roseialba*** Yamazaki, sp. nov. (Ser. Asplenifoliae Prain) [Figs. 1b, 3d]

Herba erecta, ca. 5 cm alta. Caulis simplex, pubescens, basi squamifer, squamis membranaceis ovatis vel oblongis, apiculatis vel subacutis, integris, 5–15 mm longis 2–2.5 mm latis. Folia alterna, plerunque caulina, petiolis 5–25 mm longis glabris vel sparse pilosis, laminis lineari-oblongis, 7–22 mm longis 3–5 mm latis, superne glabris, subtus sparse albo-squamatis, pinnatipartitis, segmentis ovato-oblongis 5–11 jugis, obtusis, 1–2 serratis, margine recurvatis. Flores axillares, in parte superiore caulis compacti,

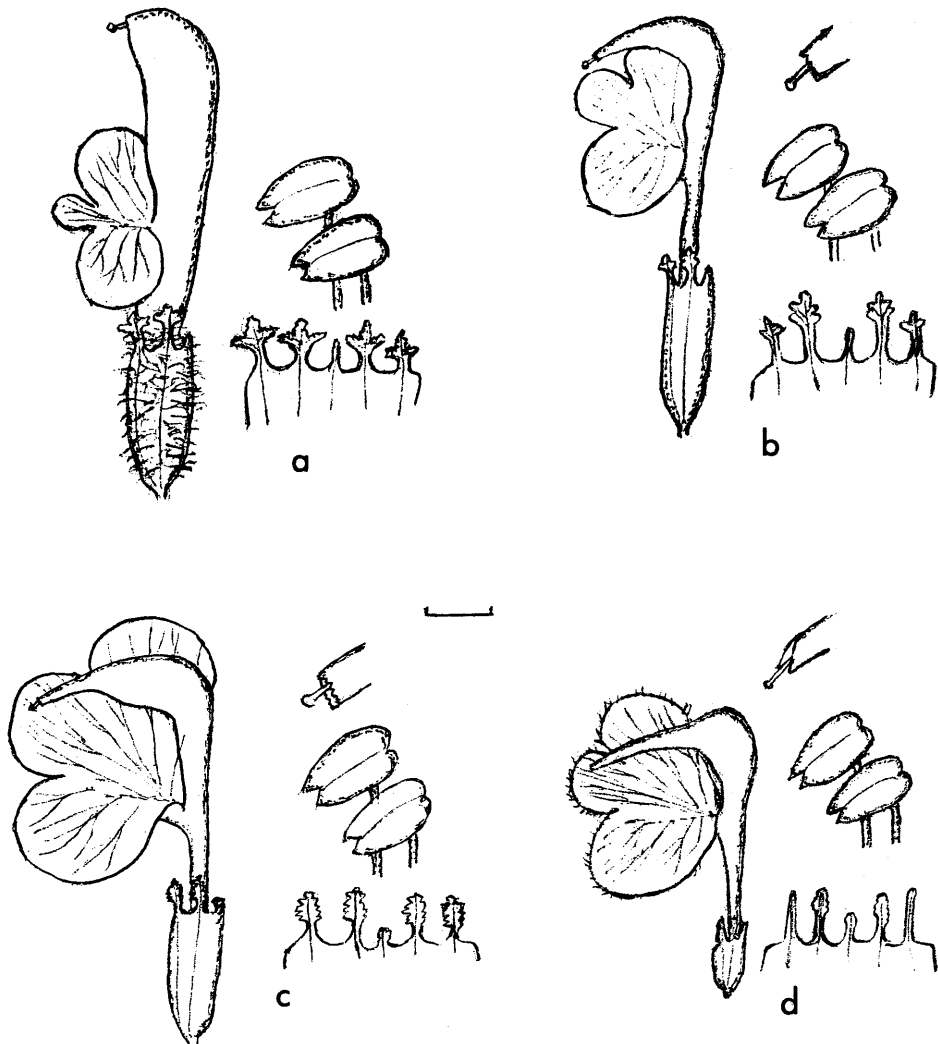


Fig. 1. a, *Pedicularis bhutanomuscoides* Yamazaki. b, *P. roseialba* Yamazaki. c, *P. cacuminidenta* Yamazaki. Bar. d, *P. flexosoides* Yamazaki. 1/3 cm for each flower.

pedicellis ca. 1 mm longis glabris. Calyx tubulosus, ca. 8 mm longus 2 mm latus, glabrus, superne 5-lobatus, lobo postico setaceo, acuto, ca. 2 mm longo, lobis lateralibus ovatis, stipitatis, 2-3 mm longis, obtusis, Corolla rosea, versus basin albato, galeo purpure, tubo ca. 12 mm longo, calyce superanti, glabro, galeo valde curvato, in parte verticali 4 mm longo, in parte antherigera 2 mm lato, versus apicem attenu-

ate rotrato, rostro ca. 3 mm longo, apice truncato denticulato, labio inferiore dilatato, ca. 5 mm longo 10 mm lato, margine glabro, 3-lobato, lobis lateralibus late orbiculatis, ca. 4 mm longis 5 mm latis, lobo medio orbiculato, ca. 2.5 mm longo et lato. Stamina, filamentis omnibus glabris. Capsula ignota.

Hab. Bhutan. Paro Distr. Bonte La 4930 m. Open low *Rhododendron* dwarf-scrub

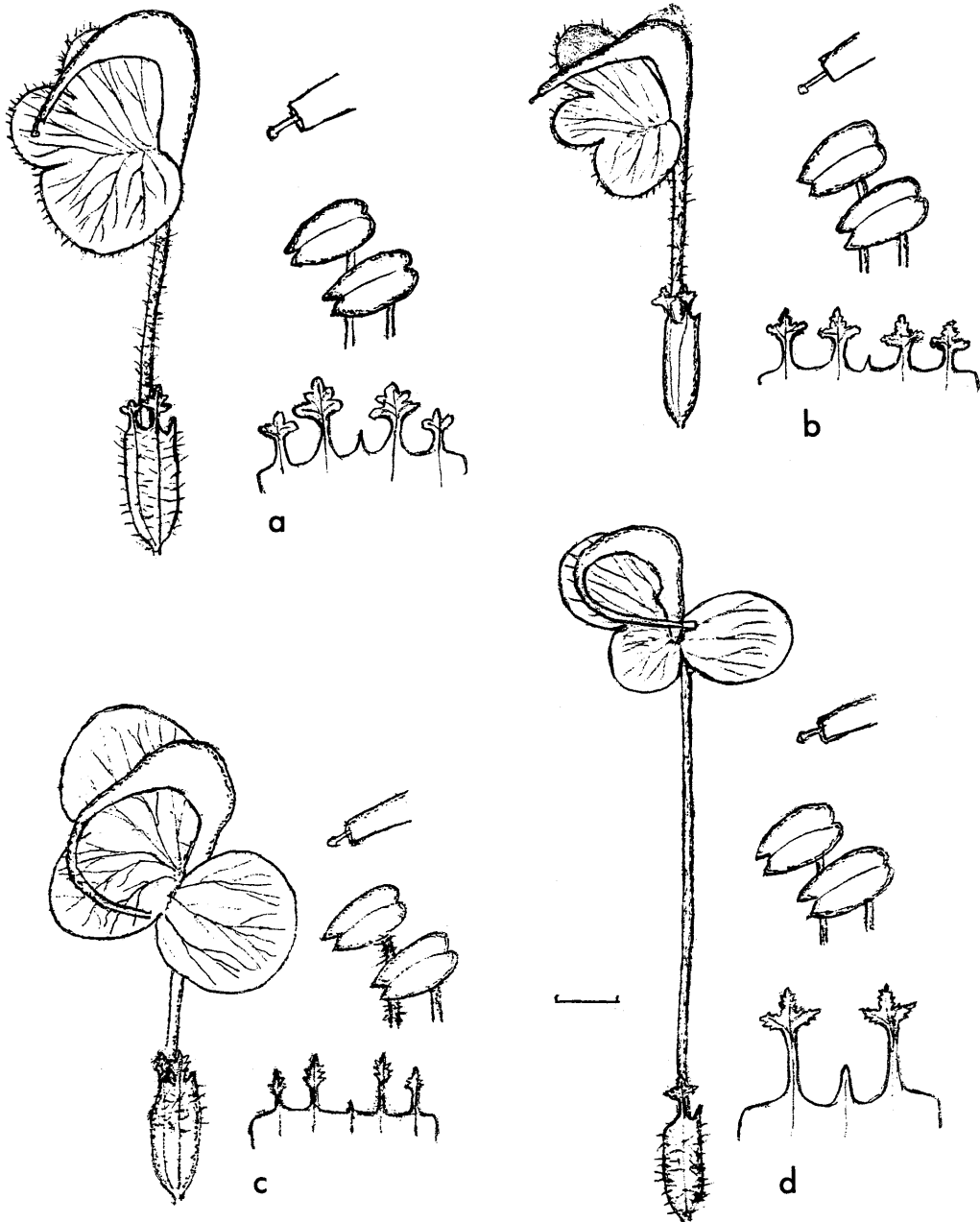


Fig. 2. a, *Pedicularis griniformis* Yamazaki. b, *P. limithangensis* Yamazaki. c, *P. elephantiflora* Yamazaki. d, *P. pseudohookeriana* Yamazaki. Bar. 1/3 cm for each flower.

with mat fragments on upper N-facing slope (G. & S. Miehe, Jul. 10, 2000, 00-184-24. Holotypus TI, Isotypus Georg-Augst Univ.,

Göttingen).

This species resembles *P. albiflora* Prain, but differs by the lineari-oblong and pinnati-

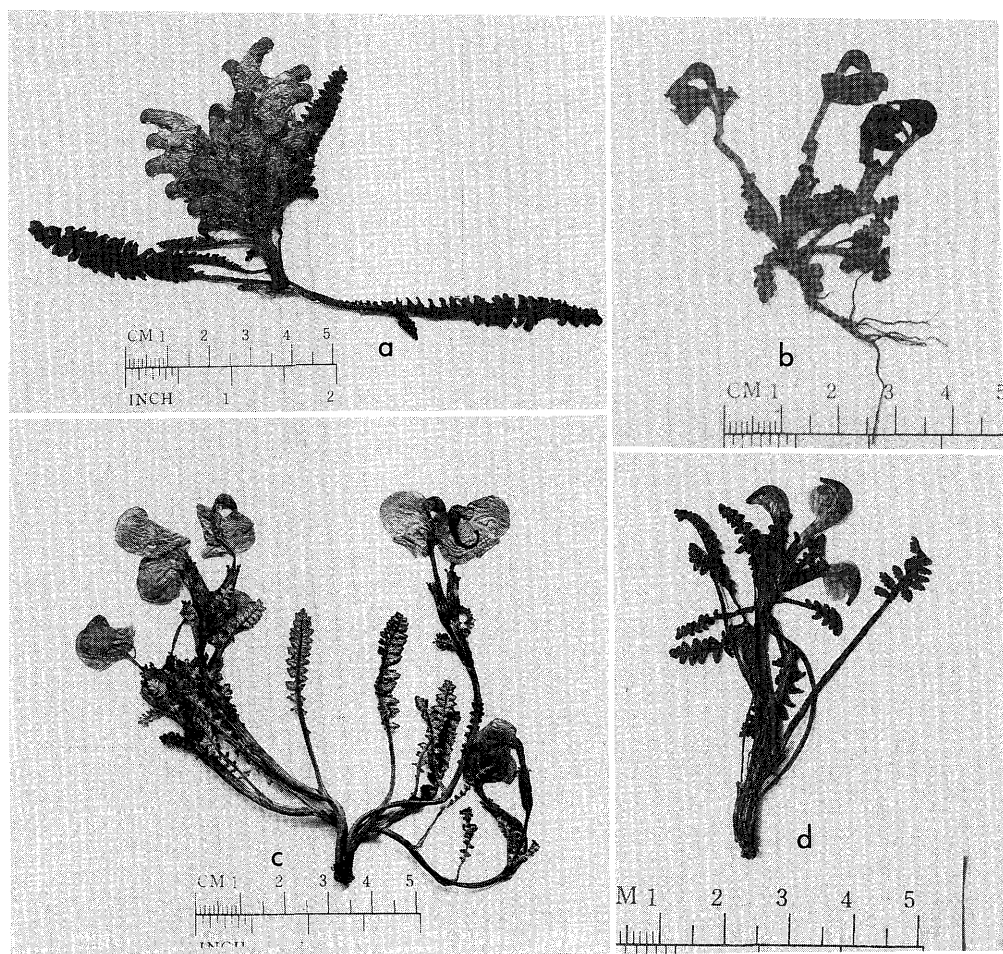


Fig. 3. a, *Pedicularis bhutanomuscoides* Yamazaki. b, *P. griniformis* Yamazaki. c, *P. elephantiflora* Yamazaki. d, *P. roseialba* Yamazaki.

fid not pinnatisect leaves, glabrous calyx and glabrous margin of lower lip of corolla.

3. ***Pedicularis cacuminidenta*** Yamazaki, sp. nov. (Ser. Filiculae) [Figs. 1c, 4a.]

Herba perennis. Cormus crassus, radicales fibrosas multas emittens. Caulis erectus simplex, 9–10 cm altus, breviter dense decurvato-pubescentis. Folia alterna, condensata, plerumque radicalia, caulina subnulla, petiolis gracilibus, 5–17 mm longis pubescentibus, laminis ovato-oblongis vel anguste oblongis,

3–15 mm longis 1.5–4 mm latis, utrinque sparse pubescentibus, pinnatifidis, segmentis 4–7 jugis, oblongis obtusis, 1–3 anguste dentatis, margine recurvatis. Flores axillares, sessiles, in sumo caulis in spicis densibus breves conjuncti. Calyx tubulosus, ca. 8 mm longus 2.5 mm latus, apice 5-lobatus, lobo postico setaceo, ca. 1.5 mm longo, lobis lateralibus ovatis obtusis, ca. 2 mm longis, 1–2 crenatis. Corolla rosea cum purple venae, tubo recto ca. 10 mm longo 1 mm lato, glabro, galeo valde curvato, in parte

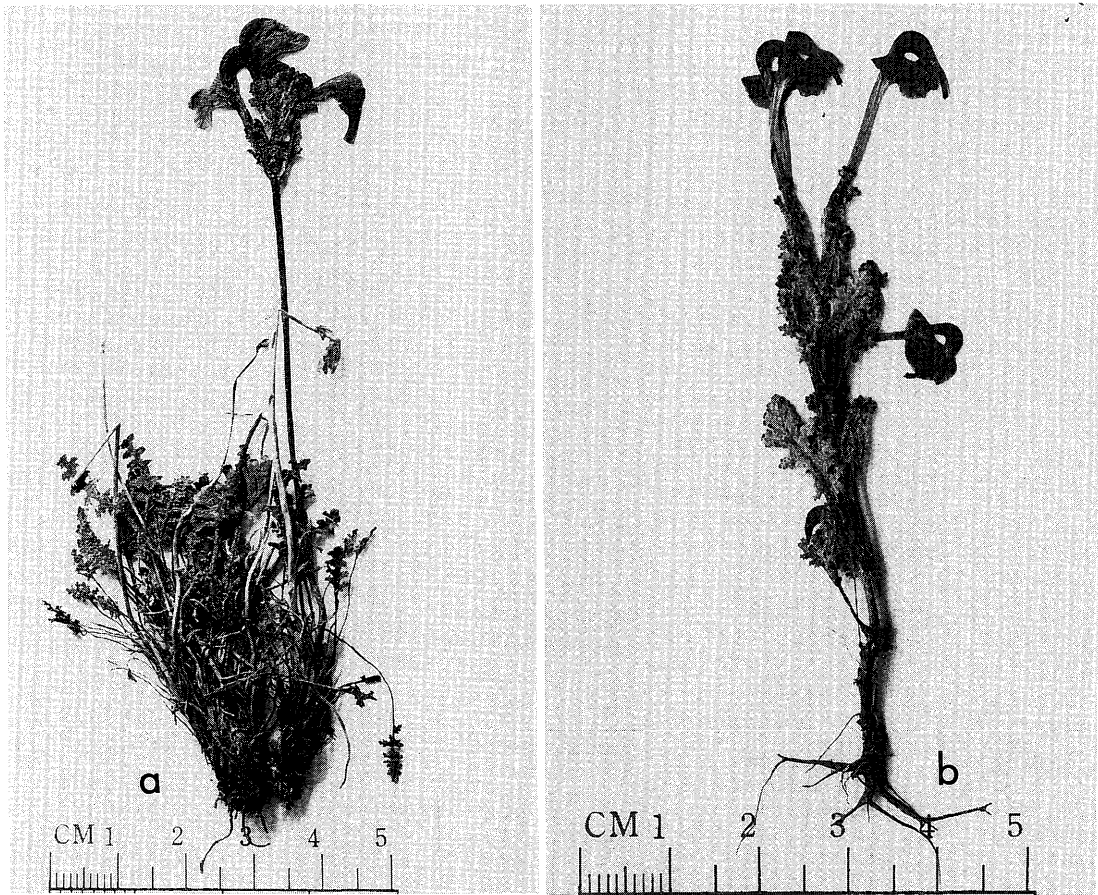


Fig. 4. a, *Pedicularis cacuminidenta* Yamazaki. b, *P. limithangensis* Yamazaki.

verticali erecto, ca. 4 mm longo, in parte antherigera ca. 3 mm lato, versus apicem attenuate rostrato, rostro ca. 5 mm longo, apice truncato dentato, labio inferiore dilatato, ca. 8 mm longo 10 mm lato, margine piloso, 3-lobato, lobis lateralibus orbiculatis ca. 5 mm longis et latis, lobo medio late orbiculato ca. 3 mm longo 5 mm lato. Stamina, filamentis omnibus glabris. Capsula oblongo-lanceolata, apice obtusa, dorsali apiculata, 6–7 mm longa 3 mm lata, glabra. Semina oblonga, canescentia, ca. 2 mm longa 0.8 mm lata, multe longitudinali-rugosa.

Hab. Bhutan. Thimpu Distr. Lamcheng 4620 m. *Kobresia nepalensis* tussock grass-

land on S-facing slope (G. & S. Miede, Jul. 19, 2000, 00-226-35. Holotypus TI, Isotypus Georg-Augst Univ., Göttingen). Gasa Distr. Baiteng 5060 m (NE of Gangla Karchung). Natural *Kobresia* grassland on S-facing under morain slope (G. & S. Miede, Aug. 23, 2000, 00-316-00, Georg-Augst Univ., Göttingen).

This species has a resemblance to *P. wallichii* Bunge, but differs by smaller leaves crowded at the base of stem, lanate calyx and glabrous staminal filaments.

4. *Pedicularis flexosoides* Yamazaki, sp. nov. (Ser. Filicaule Li) [Figs. 1d, 5b]

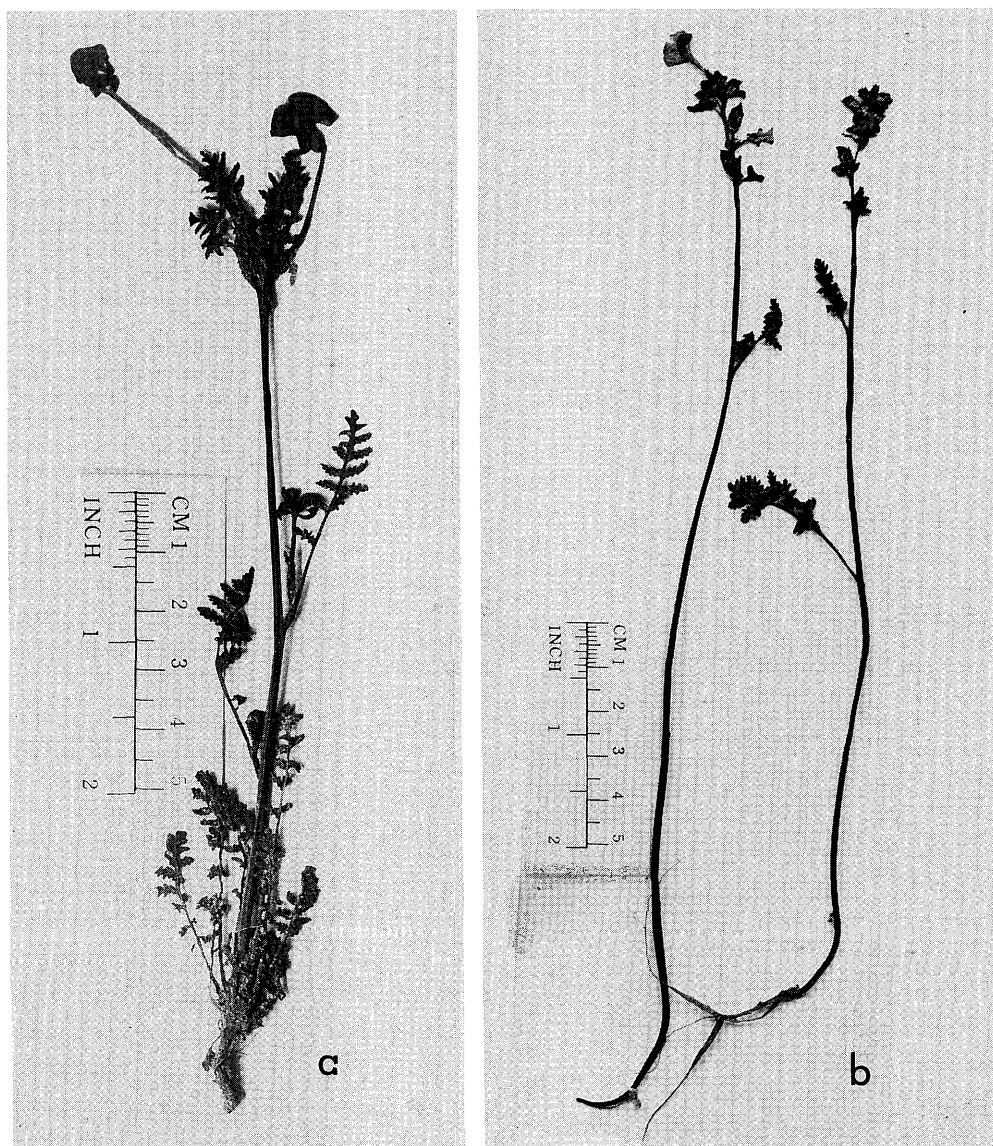


Fig. 5. a, *Pedicularis pseudohookeriana* Yamazaki. b, *P. flexosoides* Yamazaki.

Herba annua. Radix pauciramosa, radiculis simplicibus subcarnosis. Caulis erectus simplex, 10–20 cm altus, subbifario-pubescent. Folia alterna, petiolis 3–10 mm longis glabris, laminis membranaceis, oblongis vel oblongo-lanceolatis, 5–25 mm longis 4–12 mm latis, utrinque glabris,

pinnatifidis, segmentis 4–8 jugis oblongo-lanceolatis subacutis crenate serratis, margine leviter recurvatis. Flores in axillis foliorum superiorum solitalii, pedicellis tenuibus, 2–8 mm longis glabris. Calyx late tubulosus, ca. 4 mm longus 1.5 mm latus glaber, apice 5-lobatus, lobo postico lineari,

ca. 0.5 mm longo integro, apice obtuso, lobis lateralibus oblongis obtusis, ca. 1 mm longis dentatis. Corolla rosea, ca. 1.5 cm longa, tubo recto, ca. 8 mm longo 1 mm lato, galeo valde curvato, in parte verticali ca. 3 mm longo, in parte antherigera 2.5 mm lato, versus apicem attenuate rostrato, rostro ca. 5 mm longo, apice leviter bilobato, labio inferiore ca. 10 mm longo et lato, margine piloso, 3-lobato, lobis lateralibus late orbiculatis, ca. 5 mm longis 7 mm latis, lobo medio orbiculato, ca. 5 mm longo 4 mm lato. Stamina, filamentis omnibus glabris. Capula oblonga, sursum apicem attenuata, apice acuta, ca. 10 mm longa 3 mm lata, glabra.

Hab.: Bhutan. Gasa Distr. Robluthang 4840 m. Open *Rhododendron* dwarf-scrub with on N-facing slope (G. & S. Miede, Jul. 26, 2000, 00-242-13. Holotypus TI, Isotypus Georg-Augst Univ., Göttingen). Gasa Distr. Shingchen La 4850 m. Open *Rhododendron* dwarf-scrub on N-facing scree (G. & S. Miede, Jul. 2, 2000, 00-247-02, Georg-Augst Univ., Göttingen). Gasa Distr. Laya 4570 m. Open *Rhododendron* scrub on N-facing slope (G. & S. Miede, Aug. 4, 2000, 00-260-04, Georg-Augst Univ., Göttingen).

This species resembles *P. annapurnensis* Yamazaki of Nepal, but differs by smaller leaves, smaller calyx and beak of corolla bilobed at apex.

**5. *Pedicularis elephantiflora* Yamazaki, sp. nov.** (Ser. Rhinanthoides Prain)

[Figs. 2c, 3c]

Herba perennis. Caulis basi ramosus, ascendens, cum floribus 8 cm longus, bifariam pubescens. Folia alterna, basalia magna sursum gradatim minora, glabra, petiolis basalibus 1.5–2 cm longis, superioribus 2–6 mm longis glabris, laminis lineari-oblongis vel oblongis, utrinque glabris, barsalibus 1.5–2.5 cm longis 5–6 mm latis, pinnatisectis, superioribus 8–12 mm longis 3–4 mm latis, pinnatifidis, segmentis anguste ovatis acutis, argute serratis. Flores in caules

superiores axillares, pedicellis 4–10 mm longis glabris. Calyx tubulosus, ca. 10 mm longus 3 mm latus, inferiore glabrus superiore sparse pilosus, apice 5-lobatus, lobo postico setaceo ca. 1 mm longo, lobis lateralibus oblongo-ovatis stipitatis ca. 1.5 mm longis, acutis, argute pauci-serratis. Corolla rosea cum galea purpurea, tubo recto, ca. 20 mm longo 1 mm lato, glabro, calyce circ. duplo longiore, galeo valde decurvato, in parte verticali recto ca. 5 mm longo, in parte antherigera 3 mm lato, versus apicem attenuate rostrato, rostro ca. 10 mm longo, apice truncato, labio inferiore dilatato, ca. 1 cm longo 2 cm lato, 3-lobato, margine glabro, lobis lateralibus late orbiculatis ca. 1 cm longis et latis, lobo medio minore, orbiculato ca. 6 mm longo et lato. Stamina filamentis postericeis pilosis. Capsula ignota.

Hab.: Bhutan. Gasa Distr. Tsorim (Gophu La W side) 5340 m. Swamps around glacial lakes (G. & S. Miede, Sept. 8, 2000, 00-358-02. Holotypus TI, Isotypus Georg-Augst Univ., Göttingen).

This species resembles *P. rhinanthoides* Schrenk subsp. *labellata* (Jacq.) Tsoong, but differs by the narrower leaves with smaller segmentis, calyx with few hairs and corolla with shorter galea and marginally glabrous lower lip.

**6. *Pedicularis limithangensis* Yamazaki, sp. nov.** (Ser. Flexuosae Prain) [Figs. 2b, 4b]

Herba annua. Radix simplex, inferiore pauca ramosus. Caulis simplex vel basi ramosus, erectus vel ascendens, 1–6 cm longus, dense patente pilosus. Folia opposita, petiolis 3–15 mm longis, pubescentibus, laminis ovatis vel oblongis, 5–12 mm longis 2–5 mm latis, obtusis, superne sparse pubescentibus, subtus pubescentibus et dense squamulosis albidis, pinnatifidis, segmentis ovatis obtusis, 1–2 serratis. Flores axillares vel in caulem terminalem solitari, pedicellis 2–4 mm longis glabris. Calyx tubulosus, ca. 7 mm longis, sparse pubescens, apice 5-



lobatis, lobo postico setaceo, ca. 0.5 mm longo, lobis lateralibus ovatis stipitatis, 1–2 mm longis obtusis, pauce crenate serratis, margine recurvatis. Corolla purpurea, tubo recto ca. 15 mm longo, calycem duplo superante, pubescenti, galeo in parte verticali recto ca. 3 mm longo, in parte antherigera 2.5 mm lato, versus apicem attenuate rostrato, rostro ca. 5 mm longo, apice truncato integro, labio inferiore dilatato, ca. 6 mm longo 8 mm lato, margine piloso, 3-lobato, lobis lateralibus late orbiculatis, ca. 5 mm longis 6 mm latis, lobo medio orbiculato, ca. 3 mm longo et lato. Stamina, filamentis omnibus glabris. Capsula oblongo-lanceolata, apice attenuato-acuminata, ca. 10 mm longa 4 mm lata, glabra. Semina canescentia, elliptica, ca. 1.8 mm longa 1 mm lata, multe longitudinali-rugosa.

Bhutan. Gasa Distr. Limithang above Bekei 4640 m. Open, *Rhododendron* dwarf-scrub pasture on NE-facing slope (G. & S. Miehe, Aug. 7, 2000, 00-266-04. Holotypus TI). Gasa Distr. Loogi Tso, NE of Thanza 4880 m. *Kobresia* mat forming mosaics with *Juniperus* dwarf-scrub on S-facing slope (G. & F. Miehe, Sept. 18, 2000, 00-393-12, TI). Gasa Distr. Gophu La, W side 5150 m. (G. & S. Miehe, Sept. 13, 2000, 00-376-07. Georg-Augst Univ., Göttingen).

This species resembles *P. oxyrhyncha* Yamazaki of Nepal, but differs in leaves whitish beneath, much pubescent corolla-tube and glabrous staminal filaments.

**7. *Pedicularis grniformis* Yamazaki, sp. nov.** (Ser. Remotilobae Tsoong)

[Figs. 2a, 3b]

Herba annua, cum floribus 3–4 cm alta. Radix simplex, radiculis paucis emitens. Caulis breves, 3–5 mm longus. Folia alterna, ad caulem conferta, petiolis 2–7 mm longis, pilosis, laminis late oblongis, 6–10 mm longis 4–6 mm latis, obtusis, utrinque pubescentibus, pinnatifidis, segmentis 3–6 jugis, late oblongis obtusis, 1–2 crenate

serratis, margine recurvatis. Flores 2–4, axillares. Pedicelli 3–5 mm longi, glabrescentes. Calyx late tubulosus, ca. 8 mm longus 4 mm latus, pilosus, apice 5-lobatus, lobo postico setaceo, ca. 1 mm longo, lobis lateralibus late ovatis, stipitatis, obtusis, 2–3 mm longis 1–2 crenate serratis. Corolla purpurea, tubo gracili, ca. 2 cm longo 1 mm lato, calycem circ. triplo longiore, inferiore glabro, superiore piloso, galeo valde curvato, in parte verticali ca. 4 mm longo, in parte antherigera 3 mm lato, versus apicem attenuate rostrato, rostro leviter decurvato, ca. 6 mm longo, apice truncato integro, labio inferiore dilatato, ca. 7 mm longo 12 mm lato, margine piloso, 3-lobato, lobis lateralibus late orbiculatis, ca. 6 mm longis 9 mm latis, lobo medio orbiculato, ca. 4 mm longo 5 mm lato. Stamina, filamentis omnibus glabris. Capsula ignota.

Hab.: Bhutan, Gasa Distr, Ngarithang 4920 m. Forb-riching summer pasture derived from *Rhododendron* dwarf-scrub on W-facing slope (G. & F. Miehe, Aug. 20, 2000, 00-304-09. Holotypus TI, Isotypus Georg-Augst Univ., Göttingen). Gasa Distr. Limithang: above Bekei 4640 m. Open *Rhododendron* dwarf-scrub on NE-facing slope (G. & S. Miehe, Aug. 7, 2000, 00-266-24, Georg-Augst Univ., Göttingen).

This species resembles *P. odontoloma* Yamazaki of Nepal, but differs by longer corolla-tube, corolla with shorter beaks and erect part of galea without auricles part at inner base.

**8. *Pedicularis pseudohookeriana* Yamazaki, sp. nov.** (Ser. Longiflorae Prain)

[Figs. 2d, 5a]

Herba 6–15 cm alta. Radix simplex ligunosa. Caulis erectus simplex glabrescens. Folia alterna, petiolis tenuibus, 5–20 mm longis, glabris, laminis anguste oblongis vel oblongo-lanceolatis, 10–25 mm longis 3–10 mm latis, pinnatisectis, superne glabris subtus sparse pilosis, segmentis 4–8 jugis,



oblongis subacutis, argute dentatis, margine recurvatis. Flores axillares. Pedicelli tenui, 4–10 mm longi, glaberi vel sparse pilosi. Calyx tubulosus, ca. 10 mm longus 3 mm latus, sparse pilosus, apice 3-lobatus, lobo postico setaceo acuto ca. 0.5 mm longo, lobis lateralibus ovatis stipitatis, ca. 2 mm longis 1 mm latis, pauce laciniato-serratis, glabris. Corolla rosea, tubo albo tenui, ca. 3, 5 cm longo, calycem circ. triplo longiore, glabro, galeo valde decurvato, in basin minute bidentato, in parte verticali ca. 3 mm longo, in parte antherigera 2.5 mm lato, versus apicem attenuate rostrato, rostro ca. 7 mm longo, apice truncato, leviter bilobato, labio inferiore dilatato, ca. 6 mm longo 10 mm lato, margine glabro, 3-lobato, lobis lateralibus late orbiculatis ca. 5 mm longis 6 mm latis, lobo medio orbiculato, ca. 3 mm longo et lato. Stamina, filamenti omnibus glabris. Capsula oblongo-lanceolata, versus apicem attenuato-acuta, ca. 15 mm longa 7 mm lata. Semina nigra, oblonga, ca. 3 mm longa 1.5 mm lata, multe longitudinali-rugosa.

Hab. Bhutan. Bumthang Distr. Between Gorsuem and Tsochen Chen 3300 m. Shrubberies of forest margin bordering river (G. & S. Miehe, Jun. 22, 2000, 00-118-04. Holotypus TI). Gasa Distr. Rodoplhu 4330 m. Forb-rich pasture enrourched by *Rhododendron lepidotum* on SE-facing slope (G. & S. Miehe, Aug. 16, 2000, 00-290-32, Georg-Augst Univ., Göttingen, TI; 00-289-38, Georg-Augst Univ., Göttingen).

This species resembles *P. hookeriana* Wall of Nepal, but differs by smaller leaves and glabrous corolla.

The species newly found in Bhutan are enumerated as follow. The specimens cited are all preserved in Georg-Augst University, Göttingen.

9. ***Pedicularis heydei*** Prain in J. As. Soc. Bengal **58**: 258, t. 2 (1889).

Hab.: Bhutan. Paro Distr. Bonte La N side 4500–4650 m. Alpine pasture (G. & S. Miehe, Jul. 10, 2000, 00-188-18).

10. ***Pedicularis muscoides*** Li in Proc. Nat. Sci. Philad. **101**: 91 (1949).

Hab.: Bhutan. Paro Distr. Tso Phu vassley 4750 m. *Kobresia pygmaea* mat overlying rock on SE-facing slope (G. & S. Miehe, Jul. 9, 2000, 00-182-02). Paro Distr. Bonte La N side 4500 m. Alpine pastures (G. & S. Miehe, Jul. 10, 2000, 00-188-17).

11. ***Pedicularis nodosa*** Prain in Monogr. Acad. Sci. Philad. **5**: 119, t. 18B (1843).

Hab.: Bhutan. Thimpu Distr. Tulung–Lemcheng 4200 m. *Junipers indica* grove, on S-slope (G. & S. Miehe, Jul. 14, 2000, 00-205-61).

12. ***Pedicularis paradoxa*** (Prasin) Yamazaki in J. Jpn. Bot. **61**: 299 (1985).

Hab.: Bhutan. Gasa Distr. Baiteng (NE of Gangla Karchung) 5060 m. Natural *Kobresia* grassland on S-facing upper morain slope (G. & S. Miehe, Aug. 23, 2000, 00-316-16).

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山崎 敬：ブータン産シオガマギク属（ゴマノハグサ科）の8新種と4新分布種

ドイツの Miehe 夫妻は2000年の7月から9月にかけてブータンで植物の生態調査を行い、その際に多数のシオガマギク属の標本を採集してきた。

Flora of Bhutan にはシオガマギク属は76種が報告されているが、新しく12種が見つかったのでここに報告する。(165-XXXXXXXXXX 東京都中野区XXXXXXXXXX)