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Notae Mycologicae Asiae Orientalis III

Auctoribus

Seiya ITO et Yasu HOMMA

(伊藤誠哉・本間ヤス)

89. *Ustilago Inouyei* (P. HENN. et SHIRAI) S. ITO et YOSHINAGA, comb. nov.

Uredo Inouyei P. HENN. et SHIRAI, in ENGL. Bot. Jahrb. XXVIII, p. 263, 1901.

Ustilago sp. HARA, 'Jumoku-Byogai-Hen', p. 264, 1927, nom. nud.

Anthracoidea Onumae SHIRAI var. nov. in SHIRAI, List, III, p. 20, 1927, nom. nud.

Cintractia Machili HINO et NAGAOKA, Bull. Miyazaki Coll. Agr. & For. No. 3, p. 55, fig. 1, pl. I, fig. 3-4, pl. II, fig. 1-5, 1931.

Ustilago Machili S. ITO, Trans. Sapporo Nat. Hist. Soc. XIV, p. 89, 1935—Ito, Mycological Flora of Japan, II, no. 1, p. 47, fig. 49, 1936.

Hab. in gemmis *Machili longifoliae* BLUME et *M. Thunbergii* S. et Z.

Distrib. Shikoku, Kyushu.

90. *Farysia Fukushimae* S. ITO et HOMMA, sp. nov.

Ito, Mycological Flora of Japan, II, no. 1, p. 137, fig. 128, 1936, nom. seminud.

Soris in ovariiis evolutis, globosis, 4-8 mm. diam., primo in glumis tectis, dein erumpentibus, olivaceo-brunneis; sporis globosis v. ellipsoideis, 6-7.8 × 5.2-6.2 μ , interdum elongatis, usque 13 μ , guttulosi; episporio clare flavo-viride, conspicue verruculoso; inter sporas hyphis fasciculatis intermixtis.

Hab. in ovariiis *Caricis pumilae* THUNB. Yakumo, Prov. Iburi, Hokkaido (leg. T. FUKUSHI).

The present species differs from *Farysia olivacea* in brighter colour of the spores and more conspicuous small warts on the wall. Also differs from *F. Caricis-filicinae* and *F. Merrillii* in smaller size of the spores.

91. *Ustilago Poae* S. ITO

Mycological Flora of Japan, II, no. 1, p. 33, fig. 32, 1936.

Ustilago Poae-pratensis DAVIS, Phytopath. XXV, p. 816, 1935.

U. Poae-annuae DAVIS, Phytopath. XXV, p. 816, 1935.

U. striaeformis Auct. p.p.

Tilletia striaeformis Auct. p.p.

Hab. in foliis culumisque *Poae pratensis*, et *P. annuae*.

Distrib. Hokkaido, Honshu.

92. ***Tubercinia hypogaea*** (KOERN.) S. ITO, comb. nov.

ITO, Mycological Flora of Japan, II, no. 1, p. 115, fig. 110, 1936.

Urocystis hypogaea KOERN. in FUCH. Symb. Myc. III, p. 1875.

U. Ornithogali KOERN. in FISCH. v. WALDH. Aperçu Syst. Ust. p. 41.
1877—SACC. Syll. VII, p. 517—SCHELL. Beitr. Krypt. Schw. III, (2), p. 139,
fig. 70, 1911.

Tubercinia Ornithogali LIRO, Ann. Univ. Fenn. Aboensis, A ser, I, p. 45,
1922.

T. Ornithogari S. ITO, Trans. Sapporo Nat. Hist. Soc. XIV, p. 95,
1935.

Hab. in foliis vivis *Scillae Thunbergii* MIYABE et KUDO.

Distrib. Honshu.

93. ***Milesina jezoensis*** KAMEI et HIRATSUKA, emend. KAMEI

Spermogoniis hypophyllis, in areis flavidis discoloratis sparsis, plerumque in superficie stomatifera dispositis, paucis, 8–17 pro folio, minutis, rotundatis, inconspicuis, hyalinis, in sectione conspicuis, subcuticularibus, immersis, subglobosis, 110–130 μ altis, 104–154 μ latis; spermatophoris plerumque simplicibus, septatis, obclavatis, ca. 28.4 $\times$ 3.6 μ ; spermatiis angusto-ellipsoideis v. oblongo-ellipsoideis, 6.5–9 $\times$ 2–3 μ , levibus, hyalinis.

Peridermiis hypophyllis, paucis, 1–5 pro folio, in series duas utrinque ad nervum medianum disperse dispositis, albis, cylindricis, 0.2–0.28 mm. diam., ca. 1 mm. altis; peridiis hyalinis, fragilibus, apice ruptis; cellulis peridii hexagonis, oblongis v. ellipsoideis, imbricatim positis, 25–61 $\times$ 12.5–33.5 μ , parietibus interioribus crassioribus, 2–3 μ , verruculosus v. fere striatis, parietibus exterioribus tenuibus, ca. 1 μ crassis, levibus; aecidiosporis globosis v. ellipsoideis, 23–38 $\times$ 21–32 μ ; episporio dense subtiliterque verruculoso parte minuta levi excepta, hyalino, usque 1 μ crasso.

Hab. in acubus *Abietis Myrrianae* MIYABE et KUDO.

Status uredosporiferus teleutosporiferusque—KAMEI, Trans. Sapporo Nat. Hist. Soc. XII, p. 32, fig. 1–3, 1931—HIRATSUKA, Mem. Tottori Agr. Coll. IV, p. 113, 1936.

Hab. in frondibus *Polypodii vulgaris* L.

Distrib. Hokkaido.

94. *Milesina Dryopteridis* KAMEI, emend. KAMEI.

Spermogoniis hypophyllis, inconspicuis, minutis, rotundatis, numerosis, in areis plus minus discoloratis et deformibus, saepe in superficie stomatifera irregulariter disperse dispositis, hyalinis, in sectione conspicuis, subcuticularibus, profundo insidentibus, depresso-globosis v. subglobosis, $110-198 \times 110-187\mu$; spermatophoris simplicibus, septatis, subulatis, ca. $25 \times 2-4\mu$; spermatiis oblongo-cylindricis v. oblongis, $5-7.5 \times 1.2-2\mu$, levibus, hyalinis.

Peridermiis hypophyllis, in series duas utrinque ad nervum medianum irregulariter disperse dispositis, 2-4 pro folio, albis, cylindricis, usque 2 mm. altis, 0.12-0.25 mm. latis; peridiis hyalinis, fragilibus, apice ruptis; cellulis peridii plerumque elongatis, tetragonis v. hexagonis, imbricatim positis, $18-24 \times 14-20\mu$, parietibus interioribus verruculosus v. striatis, ca. 2μ crassis, parietibus exterioribus levibus, tenuibus, ca. 1μ ; aecidiosporis globosis, ovoideis v. ellipsoideis, $16-25 \times 14-23\mu$; episporio dense verruculoso parte minuta levi excepta, hyalino, usque 1μ crasso.

Hab. in acubus *Abietis Mayrianae* MIYABE et KUDO.

Status uredosporiferus et teleutosporiferus—KAMEI, Trans. Sapporo Nat. Hist. Soc. XII, p. 171, 1932—HIRATSUKA, Mem. Tottori Agr. Coll. IV, p. 109, 1936.

Hab. in frondibus *Polystichi Standisii* CHRIST=*Dryopteridis viridescens* auct.

Distrib. Hokkaido, Honshu.

95. *Hyalopsora aculeata* KAMEI, emend. KAMEI.

Spermogoniis hypophyllis, in areis flavidis discoloratis deformibusque sparsis, saepe seriatim dispositis, 2-5 pro folio, oblongis v. elongato-ellipticis, in sectione conspicuis, subepidermicis, profundo insidentibus, subconoideis, magnis, $300-600\mu$ longis, $100-300\mu$ altis, $160-440\mu$ latis; spermatophoris obclavatis, $30-50 \times 3-5\mu$, hyalinis; spermatiis oblongo-ellipsoideis, $7-9.5 \times 2.5-3.2\mu$, utrinque rotundatis, interdum truncatis, levibus, hyalinis.

Peridermiis hypophyllis, in series duas utrinque ad nervum medianum disperse dispositis, fere cylindricis, 0.3-0.48 mm. diam., 1-12 pro folio, profundo immersis; peridiis fragilibus, hyalinis, apice ruptis; cellulis peridii quadrangulibus v. irregulariter polygonalibus, leniter imbricatim positis, facile secedentibus, partie exteriore ca. 2μ crasso, dense verrucoso; aecidiosporis globosis v. globoso-ellipsoideis, $33-58 \times 30-47\mu$; episporio hyalino, $2-3\mu$ crasso, dense subtiliterque

verruculoso parte levi excepta.

Hab. in acubus *Abietis Mayrianae* MIYABE et KUDO.

Status uredosporiferus et teleutosporiferus—KAMEI, Trans. Sapporo Nat. Hist. Soc. XII, p. 128, fig. 1-3, 1932—HIRATSUKA, Mem. Tottori Agr. Coll. IV, p. 172, pl. VI, fig. 1, 1936; et UEMURA, Trans. Tottori Soc. Agr. Sci. IV, p. (22), 25, 1932, p.p.

Hab. in frondibus *Spicantopsidis nipponicae* NAKAI var. *japonicae* NAKAI = *Blechni Spicant* WITHER var. *nipponici* MIYABE et KUDO.

Distrib. Saghalin, Hokkaido, Honshu, Shikoku, Kyushu.

96. *Bubakia cingens* (SYDOW) S. ITO, comb. nov.

Uredo Brideliae KOODERS, Vorh. Koninkl. Akad. Wetensch. Amsterdam, II, Sect. XIII, p. 201, 1907—SACC. Syll. XXI, p. 800.

Melampsora cingens SYDOW, Ann. Myc. IX, p. 143, 1911.

Schroeteriaster cingens SYDOW, Ann. Myc. X, p. 270, 1912; Monogr. Ured. III, p. 404, 1914—SACC. Syll. XXIII, p. 841.

Phakopsora Brideliae ARTHUR, Bull. Torr. Bot. Club, XLIV, p. 508, 1917.

Bubakia Brideliae DIETEL, in ENGL-PRANTL, Natürl. Pfl.-Fam. II Aufl. VI, p. 48, 1928—SACC. Syll. XXI, p. 800.

Phakopsora cingens HIRATSUKA, Bot. Mag. Tokyo, L, p. 2, 1936.

Hab. in foliis *Flueggeae microcarpae* BLUME = *F. virosae*.

Distrib. Formosa.

97. *Bubakia Ehretiae* (HIRATSUKA) S. ITO, comb. nov.

Phakopsora Ehretiae HIRATSUKA, Bot. Mag. Tokyo, XIV, p. 92, pl. III, fig. 10-13, 1900.

Schroeteriaster Ehretiae SYDOW et BUTL. Ann. Myc. X, p. 270, 1912—SACC. Syll. XXIII, p. 842—SYDOW, Monogr. Ured. III, p. 405, pl. XV, fig. 147, 1914.

Hab. in foliis *Ehretiae Dicksoni* HANCE, var. *liukiensis* NAKAI, *E. taiwanianae* NAKAI, *E. thyrsiflorae* NAKAI.

Distrib. Honshu, Shikoku, Kyushu, Loochoo, Formosa.

98. *Melampsorella Itoana* (HIRATSUKA) S. ITO et HOMMA, comb. nov.

Chnoopsora Itoana HIRATSUKA, Jap. Jour. Bot. III, p. 297, 1927.

Spermogoniis peridermiisque ignotis. Uredosporis nullis.

Soris teleutosporiferis hypophyllis, minutis, sparsis v. aggregatis, tandem omnino confluentibus, usque 8 mm. diam., crustaceis, sordide flavis, dein albicantibus; teleutosporis intra cellulas epidermidis evolutis, unicellularibus, cylin-

draceis v. clavatis, unistratosis, lateraliter arcteqe coalitis, flavidis, $26-37.6 \times 8-14.5\mu$, simul maturantis, episporio ca. 1μ crasso.

Hab. in foliis *Oxalidis Acetosellae* L., et var. *japonicae* MAKINO, *O. Griffithii* EDGEW. et HOOK. f., *O. obtriangulatae* MAXIM.

Distrib. Saghalin, Kurile, Hokkaido, Honshu, Shikoku, Formosa.

The life cycle of this fungus is still unknown and its systematic position is also doubtful in the present. One layered crust of unicellular, cylindrical teleutospores would place this species in a group with *Chnoopsora*, *Aplopsora*, *Melampsoridium* and *Melampsora*. From the former two, it is quite different in the indehiscent teleutosori, as well as in the simultaneous ripening and the delayed germination of the teleutospores. In the teleutospore formation in the epidermal cell cavity, it is not only different from these genera, but also from the latter two. Although the uredostage absents and the general character of the teleutospores does not coincide well, we would classify presumably this fungus as a member of the genus *Melampsorella*, laying stress on the position of the teleutospore formation.

99. *Phakopsora Nishidana* S. ITO, sp. nov.

Phakopsora Fici NISHIDA, 'Engei-no-tomo,' VII, p. 881, 1911, nom. nud.

Soris uredosporiferis hypophyllis, maculis flavo-brunneis insidentibus, sparsis v. aggregatis, minutis, rotundatis, $0.2-0.3$ mm. diam., primo epidermide tectis, dein nudis, pulverulentis, flavidis; paraphysibus paucis, periphericis v. intermixitis, clavatis, hyalinis, ca. $26 \times 10\mu$; uredosporis globosis, ellipsoideis v. ovatis, flavidis v. flavo-brunneis, $18-24 \times 16-18\mu$; episporio ca. 1μ crasso, verruculoso, poris germinationis obscuris.

Soris teleutosporiferis hypophyllis, numerosis, subepidermicis, sparsis v. aggregatis, maculis rufo-brunneis insidentibus, $0.2-0.8$ mm. diam., crustaceis, indehiscentibus, atris; teleutosporis in strata 2-4 superpositis, coalitis, oblongis, flavidis, $15-20 \times 8-12\mu$; episporio ca. 1.5μ crasso.

Hab. in foliis *Fici Caricae* L., *F. erectae* THUNB.

Distrib. Kyushu.

This species is quite different from Formosan *Uredo* parasitic on common fig plant in the smaller size of the uredospores and the common occurrence of the teleutospores with the uredospores. The characters of the teleutospores are also different from *Physopella Fici* ARTH. = (*Cerotelium Fici* ARTHUR, *Kueneola Fici* BUTL.), of which the teleutospores were described and illustrated by BUTLER from the Indian specimen of *Ficus glomerata*.

100. *Cerotelium Tanakae* S. ITO, sp. nov.

Soris uredosporiferis hypophyllis, sparsis, minutissimis, 0.1–0.5 mm. diam., leniter pulverulentis, aurantiacis; uredosporis ellipsoideis v. obovatis, $16-26 \times 15-19\mu$; episporio hyalino, 1.5–2 μ crasso, verrucoso; poris germinationis indistinctis, intus aurantiacis; paraphysibus periphericis, clavatis, introrsum curvatis, ubique tenue tunicatis, $24-40 \times 7-12\mu$.

Soris teleutosporiferis sparsis v. subaggregatis, irregulariter rotundatis, minutis, ca. 0.2 mm. diam., pulvinatis, erumpentibus, leniter ceraceis, pallide aurantiacis, in germinatio rufo-albis; teleutosporis unicellularibus, oblongis v. cylindraceis, $22-36 \times 7-12\mu$, 2–3 cellulis cattenulatis; statim germinantis, episporio ubique tenuissimo, ca. 1 μ crasso, hyalino.

Hab. in foliis *Falcatae comosae* KUNTZE var. *japonicae* MAKINO.

Distrib. Hokkaido.

101. *Coleosporium taisetsuensis* S. ITO et HOMMA, sp. nov.

Coleosporium Saussureae (non THÜMEN) HIRATSUKA, Trans. Sapporo Nat. Hist. Soc. IX, p. 222, 1927.

Spermogoniis subepidermicis, depresso-conoideis, conspicuis, brunneis, 98–140 μ altis, 0.7–1.2 mm. longis, 0.3–0.5 mm. latis.

Peridermiis amphigenis, plerumque hypophyllis, in series unam v. duas dispositis, longitudinaliter dehiscentibus, 0.5–1.6 mm. longis, 0.3–0.6 mm. altis; peridiis fragilibus, hyalinis; cellulis peridii oblongis v. lanceolato-oblongis, leniter imbricatum positis, facile secedentibus, $45-61 \times 25-31\mu$, frequenter utrinque acutis, parte interiore 7–11 μ crasso, dense verrucoso; aecidiosporis subglobosis v. oblongis, $23.5-34 \times 18-23.5\mu$; episporio ca. 2 μ crasso, verruculoso.

Soris uredosporiferis hypophyllis, minutis, rotundatis, 0.3–0.8 mm. diam., sparsis v. circulariter dispositis, rarius aggregatis, mox nudis, pulverulentis, aurantiacis, dein pallescentibus; uredosporis globosis v. subglobosis, rarius ellipsoideis, $22-26 \times 21-24\mu$; episporio verrucoso, hyalino, intus flavidis.

Soris teleutosporiferis hypophyllis, minutis, rotundatis v. irregulariter rotundatis, 0.4–1 mm. diam., sparsis v. circulariter dispositis, flavo-brunneis v. aurantiacis; teleutosporis cylindraceis v. prismatis, $95-106 \times 17-26\mu$, apice rotundatis, 19–32 μ crassis, basis plerumque rotundatis, flavidulis.

Hab. Spermatis et aecidiosporae in acubus *Pini pumilae* REGEL.

Uredo- et teleutosporae in fo s vivis *Saussureae Nambuanae* KOIDZ., *S. Riederi* HERD., *S. triangulatae* TRAUTV. et MEY.

Distrib. Saghalin, Kurile, Hokkaido, Honshu.

The present fungus is easily distinguishable from *Coleosporium Saussureae*

THÜM. by its roundish uredospores. The generic connection was proved successfully by HIRATSUKA in 1927.

Key to the species of *Puccinia* on Japanese Cyperaceae

- A. Host belonging to genus *Carex*.
 - a. Uredospore-wall colored.
 - I. Uredospores of one sort.
 - 1. Uredospores with 3, sometimes 2 or 4, equatorial pores.
 - α. Paraphyses absent.
 - i. Teleutospore-apex undivided.
 - * Uredospore-wall evenly thickened.
 - Teleutospore-wall notably thick.
 - △ Teleutospores very large, $48-90 \times 18-27\mu$, uredospores $24-38 \times 20-25\mu$, on *Carex Kobomugi* and *C. pumila*, aecidia on *Artemis* a. ***P. Caricis-macrocephalae***
 - △ Teleutospores medium-sized, $36-59 \times 15-24\mu$, Uredospores very large, $28-39 \times 25-34\mu$, on *Carex Lyngbei*. ***P. Yaramesuge*** n. sp.
 - Teleutospore-wall moderately thick (Caricis type).
 - △ Teleutospores $42-64 \times 14-23\mu$, uredospores $23-32 \times 20-33\mu$, on *Carex confertiflora*, *C. forficula*, *C. Gmelini*, *C. ischnostachya*, *C. traiziscana*, etc., aecidia on *Urtica*. ***P. Caricis***
 - △ Teleutospores $43-64 \times 16-24\mu$, uredospores $21-25 \times 19-22\mu$, on *Carex Lyngbei*, aecidia on *Ribes*. ***P. Pringsheimiana***
 - △ Teleutospores $31-52 \times 13-22\mu$, uredospores $17-27 \times 16-22\mu$, on *Carex hakonensis*, *C. limosa* var. *fusco-cuprea*, *C. pseudo-curaica*, aecidia on *Lysimachia*. ***P. limosae***
 - * Basal wall of uredospores thickened, teleutospores $34-56 \times 14-21\mu$, uredospores $23-29 \times 21-22\mu$, on *Carex amblyolepis* ***P. Caricis-amblyolepis*** n. sp.
 - ii. Teleutospore-apex often divided, teleutospores $36-50 \times 10-15\mu$, uredospores $28-36 \times 18-25\mu$, on *Carex siderosticta*. ***P. mandshurica***
 - β. Paraphyses present.
 - i. Teleutospores $45-62 \times 13-15\mu$, uredospores $22-29 \times 17-21\mu$, on *Carex pilosa*. ***P. Caricis-pilosae*** n. sp.
 - ii. Teleutospores somewhat smaller than the preceding species.
 - * Teleutospores $34-59 \times 13-18\mu$, uredospores $21-26 \times 16-22\mu$, on *Carex Thunbergii*. ***P. Caricis-Thunbergii*** n. sp.
 - * Teleutospores $39-56 \times 11-18\mu$, uredospores larger, $21-29 \times 18-24\mu$, on *Carex japonica* and *C. Zollingeri*. ***P. Caricis-japonicae***
 - 2. Uredospores with 2 or 3 equatorial pores.
 - α. Two cells of teleutospores almost equal-sized.
 - i. Teleutospores long pedicellate, fattened, $35-58 \times 17-27\mu$, uredospores $29-35 \times 24-34\mu$, on *Carex lanceolata*. ***P. aomoriensis***
 - ii. Teleutospores short pedicellate.
 - * Teleutospores $45-64 \times 18-22\mu$, uredospores $20-30 \times 15-22\mu$, on *Carex*

- siderosticta* and its var. *bracteosa*, aecidia on *Cacalia*.
 ***P. Caricis-siderostictae***
- * Teleutospores $39-53 \times 18-27\mu$, uredospores little larger, $23-31 \times 21-27\mu$, on *Carex shimidzensis*. ***P. Caricis-shimidzensis*** n. sp.
- β. Lower cell of teleutospores slender.
- i. Teleutospore-apex mostly acute, teleutospores $38-51 \times 13-21\mu$, uredospores $20-26 \times 18-22\mu$, on *Carex oxyandra*. ... ***P. Aecidii-Leucanthemi***
- ii. Teleutospore-apex rounded or obtuse.
- * Teleutospores $34-66 \times 16-26\mu$, uredospores $26-32 \times 18-25\mu$, on *Carex Lyngbei*. ***P. Lingbei***
- * Teleutospores $31-64 \times 12-21\mu$, uredospores $25-39 \times 18-32\mu$, on *Carex dispalata*, *C. laevirostris*, *C. mollicula* and *C. vesicaria*.
 ***P. Caricis-molliculae***
- * Teleutospores smaller, $31-52 \times 10-16\mu$, uredospores also smaller, $18-25 \times 15-18\mu$, on *Carex japonica* and *C. Zollingeri*. ***P. moiwensis***
- γ. Lower cell of teleutospores often very long.
- i. Longer teleutospores $83-91 \times 13-18\mu$, uredospores $22-35 \times 16-24\mu$, on *Carex Miyabei*. ***P. lineariformis***
- ii. Longer teleutospores $37-58 \times 14-22\mu$, uredospores $26-28 \times 22-27\mu$, on *Carex sadoensis*. ***P. Caricis-sadoensis*** n. sp.
3. Uredospore-pores 2 above the equator.
- α. Teleutospore-apex often truncate, teleutospores $36-60 \times 14-22\mu$, uredospores $21-27 \times 17-22\mu$, on *Carex stipata*. ***P. extensicola***
- β. Teleutospore-apex rounded or obtuse.
- i. Teleutospore-apex considerably thickened, up to 16μ , teleutospores $37-62 \times 15-22\mu$, uredospores $21-26 \times 13-23\mu$, on *Carex pseudo-loliacea*.
 ***P. Caricis-pseudololiaceae*** n. sp.
- ii. Teleutospore-apex thinner than the preceding.
- * Constriction at the septum stronger, teleutospores $47-65 \times 14-20\mu$, uredospores $21-30 \times 14-20\mu$, on *Carex rhizopoda* f. *langior*.
 ***P. Caricis-shizopodae*** n. sp.
- * Constriction at the septum moderate.
- † Teleutospores $45-87 \times 14-20\mu$, uredospores $25-28 \times 18-22\mu$, on *Carex conica* and *C. scabrifolia*. ***P. shikokiana***
- † Teleutospores $33-60 \times 16-18\mu$, rarely up to 70μ long, uredospores $21-29 \times 15-22\mu$, on *Carex Middendorffii*. ... ***P. silvatica***
4. Uredospore-pores 2 below the equator.
- α. Teleutospores $29-45 \times 16-21\mu$, uredospores $21-29 \times 16-21\mu$, on *Carex mollicula*.
 ***P. yokogurae***
- β. Teleutospores smaller, $29-39 \times 12-18\mu$, uredospores $20-26 \times 18-21\mu$, on *Carex* sp. ***P. yokotensis***
5. Uredospores with 4 or more pores near or below the equator.
- α. Teleutospores $38-57 \times 14-21\mu$, uredospores $25-29 \times 19-21\mu$, on *Carex* sp. ...
 ***P. nonensis***
- β. Teleutospores slender, $45-64 \times 11-15\mu$, uredospores $26-32 \times 22-29\mu$, on *Carex Maximowiczii*. ***P. Caricis Maximowiczii*** n. sp.
6. Uredospore-pores scattered, teleutospores $28-48 \times 11-18\mu$, uredospores $18-25 \times 18-21\mu$, on *Carex Middendorffii*. ***P. karelica***

7. Uredospore-pores indistinct.
- α. Uredospore-wall notably thick, teleutospores $44-51 \times 21-26\mu$, uredospores $33-38 \times 30-34\mu$, on *Carex siderosticta*. **P. Taganesuge** n. sp.
- β. Uredospore-wall not so thick.
- * Teleutospores long pedicellate, $27-52 \times 12-20\mu$, uredospores $20-32 \times 15-27\mu$, on *Carex brunnea* and *C. gibbosa*. **P. Caricis-gibbosae**
- * Teleutospores short pedicellate.
- † Teleutospores $36-55 \times 18-24\mu$, uredospores $18-26 \times 18-21\mu$, on *Carex lanceolata*. **P. Caricis-montanae**
- † Teleutospores $35-56 \times 14-22\mu$, uredospores $26-37 \times 22-35\mu$, on *Carex leucochloa* and its var. *fiiculmis*. **P. breviculmis**
- † Teleutospores $29-44 \times 13-21\mu$, uredospores $23-29 \times 18-24\mu$, on *Carex pseudoconica* and *C. siderosticta*. **P. Miyakei**
- II. Uredospores of two sorts, one with scattered 4-8 pores, $15-22 \times 13-18\mu$, other with 4 equatorial pores, $20-32 \times 15-21\mu$, teleutospores $30-38 \times 13-16\mu$, on *Carex brunnea*. **P. Caricis-brunneae**
- b. Uredospore-wall hyaline or light colored.
- I. Paraphyses present, teleutospores $52-84 \times 17-28\mu$, uredospores $31-39 \times 23-37\mu$, on *Carex conica*. **P. Caricis-conicae** n. sp.
- II. Paraphyses absent.
1. Uredospores larger, globoid or broad ellipsoid.
- α. Teleutospores $44-72 \times 14-23\mu$, uredospores $31-36 \times 25-29\mu$, on *Carex okushirensis*. **P. Caricis-okushirensis** n. sp.
- β. Teleutospores $34-46 \times 17-25\mu$, uredospores $25-32 \times 24-28\mu$, on *Carex japonica*. **P. Caricis-trichostylis**
2. Uredospores smaller, ovoid or ellipsoid, $18-25 \times 16-21\mu$, teleutospores $31-60 \times 13-20\mu$, on *Carex siderosticta*. **P. hyalina**
- c. Uredospores unknown.
- I. Amphispores present.
1. Teleutospores $35-52 \times 15-18\mu$, amphispores $34-55 \times 18-26\mu$, with 4 pores, on *Carex Miyabei*. **P. xenosperma**
2. Teleutospores $39-57 \times 14-23.5\mu$, amphispores $22-45.5 \times 13-21\mu$, with 3 pores, on *Carex capillacea*. **P. Hommae** n. sp.
- II. Amphispores absent, teleutospores $35-48 \times 12-18\mu$, on *Carex filicina*. **P. Caricis-filicinae**
- B. Host belonging to genus Cyperus.
- a. Teleutospores $49-75 \times 17-21\mu$, uredospores $23-29 \times 21-23\mu$, with 2 or 3 equatorial pores, on *Cyperus pilosus*. **P. Cyperi-pilosus** n. sp.
- b. Teleutospores smaller than the preceding species, $35-50 \times 12-16\mu$, uredospores $13-18$, pores indistinct, on *Cyperus globosus* and *C. rotundus*. **P. philippinensis**
- C. Host belonging to genus Eriophorum. **P. Eriophori**
- D. Host belonging to genus Fimbristylis. **P. flavipes**
- E. Host belonging to genus Heleocharis.
- a. Uredospores with 2 equatorial pores, $13-21 \times 18-27\mu$, on *Heleocharis plantaginea*. **P. liberta**
- b. Uredospores with 4, rarely 3 or 5, equatorial pores, $26-40 \times 17-24\mu$, on *Heleocharis afflata* and *H. japonica*. **P. Eleocharidis**
- F. Host belonging to genus Juncellus. **P. Juncelli**

G. Host belonging to genus *Kyllingia*.

- a. Teleutospores
- $40-52 \times 13-20\mu$
- , uredospores
- $24-31 \times 16-24$
- , on
- Kyllingia brevifolia*
-

... .. *P. Kyllingiae-brevifoliae* n. sp.

- b. Teleutospores smaller,
- $30-40 \times 10-18\mu$
- , uredospores also smaller,
- $17-26 \times 12-20\mu$
- , on
- Kyllingia monocephala*
-
- P. mysorensis*

H. Host belonging to genus *Rhynchospora*. *P. Rhynchosporae*I. Host belonging to genera *Scirpus* and *Scleria*.

- a. Teleutospores not divided at apex.

- I. Teleutospores large,
- $45-68 \times 14-26\mu$
- , uredospores
- $23-33 \times 21-25\mu$
- , on
- Scirpus orientalis*
- ,
- S. Wichurai*
- var.
- concolor*
- , var.
- borealis*
- , and
- Scleria scrobiculata*
- , aecidia on
- Lycopus*
- .
-
-
- P. angustata*

- II. Teleutospores small,
- $29-60 \times 12-23\mu$
- , uredospores
- $19-26 \times 15-19\mu$
- , on
- Scirpus hotarui*
- ,
- S. Tabernaemontani*
- and
- S. triqueter*
- , aecidia on
- Limnantheum*
-
- P. Scirpii*

- b. Teleutospores sometimes with coronate apex, teleutospores small,
- $29-56 \times 12-19\mu$
- , uredospores
- $19-26 \times 13-21\mu$
- , on
- Scirpus triqueter*
-
- P. subcoronata*

102. *Puccinia Yaramesuge* HOMMA, sp. nov.

Soris uredosporiferis hypophyllis, minutis, oblongis, ca. 0.5 mm., sparsis, epidermide laxe tectis, brunneolis; uredosporis subglobosis, echinulatis, brunneis, $28-39 \times 25-34\mu$, poris germinationis 3 v. 4 aequatorialibus instructis.

Soris teleutosporiferis amphigenis, plerumque hypophyllis, minutis, oblongis v. elongatis, 0.5-1 mm. longis, sparsis, primo epidermide tectis, dein nudis, pulverulentis, atris; teleutosporis oblongis v. clavatis, utrinque rotundatis, apice valde incrassatis ($7-12\mu$), medio leniter constrictis, levibus, brunneis, ad apicem obscurioribus, $36-59 \times 15-24\mu$; pedicello persistenti, flavido, $13-24\mu$ longo; mesosporis immixtis.

Hab. in foliis *Caricis Lyngbei* HORNEM.

Distrib. Saghalin.

The present fungus resembles *Puccinia Pringsheimiana* and *P. Lyngbei* in the form of its teleutospores, but differs in its larger and broader uredospores with many germ-pores respectively.

103. *Puccinia Caricis-amblyolepis* HOMMA, sp. nov.

Soris uredosporiferis hypophyllis, minutis, rotundatis v. oblongis, 0.2-0.5 mm. longis, sparsis, mox nudis, pulverulentis, brunneis; uredosporis ovoideis v. late ellipsoideis, echinulatis, flavo-brunneis, $23-29 \times 21-22\mu$, basi incrassatis ($5-6\mu$), poris germinationis 3, raro 2, aequatorialibus instructis.

Soris teleutosporiferis hypophyllis, minutis, oblongis v. linearibus, 0.5-1 mm. longis, sparsis v. aggregatis, atro-brunneis; teleutosporis clavatis, apice plerumque rotundatis, rarius conoideis v. truncatis, valde incrassatis ($5-16\mu$), basi attenuatis, medio constrictis, levibus, flavo-brunneis, ad apicem obscurioribus, $34-56 \times 14-21\mu$; pedicello flavido, persistenti, $18-21\mu$ longo.

Hab. in foliis *Caricis amblyolepis* TRAUTV. et MEY.

Distrib. Saghalin.

The present fungus somewhat relates to *Puccinia limosae*, but differs in the smaller size of the teleutospores with thicker apex, as well as in the color of teleutosori.

104. *Puccinia Caricis-pilosae* MIURA, sp. nov.

Soris uredosporiferis epiphyllis, minutis, rotundatis, ca. 0.2 mm. diam., sparsis, diu epidermide tectis, flavis; uredosporis ovatis v. piriformibus, echinulatis, flavidis v. flavo-brunneis, $22-29 \times 17-21\mu$; episporio 2μ crasso, poris germinationis 4 aequatorialibus instructis; paraphysibus clavatis tenuisque intermixtis.

Soris teleutosporiferis hypophyllis, rotundatis v. oblongis, 0.5-1 mm. longis, primo epidermide tectis, dein nudis, atris; teleutosporis clavatis v. fusiformibus, apice rotundatis v. conoideis, raro rotundatis, incrassatis ($3-7\mu$), basi plerumque attenuatis, medio leniter constrictis, brunneis, ad apicem obscurioribus, levibus, $45-62 \times 13-19\mu$; pedicello persistenti, hyalino, usque 30μ longo.

Hab. in foliis *Caricis pilosae* SCOP.

Distrib. Hokkaido.

This fungus is characterized in the presence of paraphyses as *Puccinia Caricis-Thunbergii* and *P. Caricis-japonicae*. From the latter two species, it differs in the larger teleutospores.

105. *Puccinia Caricis-Thunbergii* HOMMA, sp. nov.

Soris uredosporiferis hypophyllis, minutis, oblongis, ca. 0.5 mm. longis, sparsis, diu epidermide tectis, brunneis; uredosporis ovatis v. ellipsoideis, echinulatis, hyalinis v. flavidis, $21-26 \times 16-22\mu$, poris germinationis 3 aequatorialibus instructis; paraphysibus clavatis, hyalinis.

Soris teleutosporiferis hypophyllis, minutis, oblongis, 0.2-0.7 mm. longis, sparsis, primo epidermide tectis, dein nudis, atris; teleutosporis clavatis, raro oblongis, apice rotundatis v. truncatis, valde incrassatis ($8-11\mu$), basi leniter attenuatis, medio constrictis, levibus, brunneis, ad apicem obscurioribus, $34-59 \times 13-18\mu$; pedicello persistenti, hyalino, $26-29\mu$ longo.

Hab. in foliis *Caricis Thunbergii* STEUD.

Distrib. Hokkaido.

This fungus differs from *Puccinia limosae* in the presence of paraphyses and from *P. Caricis-pilosae* in the smaller uredospores.

106. *Puccinia Caricis-shimidzensis* HOMMA, sp. nov.

Soris uredosporiferis hypophyllis, minutis, oblongis, 0.2-0.5 mm. longis,

sparsis v. seriatim dispositis, diu epidermide tectis, brunneolis; uredosporis globosis v. ovatis, basi leniter incrassatis, verrucoso-echinulatis, flavo-brunneis, $23-31 \times 21-27\mu$, poris germinationis 2, raro 3, aequatorialibus instructis; episporio $5-6\mu$ crasso.

Soris teleutosporiferis plerumque hypophyllis, seriatim dispositis, saepe confluentibus, linearibus, mox nudis, atro-brunneis; teleutosporis clavatis v. ellipsoideis, utrinque rotundatis, apice valde incrassatis ($9-10\mu$), medio modice v. leniter constrictis, levibus, brunneis, $39-53 \times 18-27\mu$; pedicello persistenti, hyalino v. flavido, usque 21μ longo.

Hab. in foliis *Caricis shimidzensis* FR.

Distrib. Hokkaido, Honshu.

The fungus differs from *Puccinia Caricis-molliculae* by the wider teleutospores, from *P. Caricis-siderostictae* by the larger uredospores, and from *P. Lyngbei* by the round apex of the teleutospores.

107. *Puccinia Caricis-sadoensis* HOMMA, sp. nov.

Soris teleutosporiferis culmicolis v. amphigenis plerumque hypophyllis, oblongis, 0.2-1 mm. longis, nudis, brunneis v. atro-brunneis; uredosporis immixtis ellipsoideis v. ovatis, verrucosis, flavo-brunneis, $26-28 \times 22-27\mu$, poris germinationis 2 v. 3 instructis; teleutosporis clavatis v. oblongis, apice rotundatis v. truncatis, rarius acutis, basi attenuatis v. rotundatis, medio modice v. leniter constrictis, levibus, flavo-brunneis, brevioribus in culmibus, $35-43 \times 13-20\mu$, longioribus in foliis, $37-58 \times 14-22\mu$; pedicello persistenti, flavido, interdum deorsum rufo-brunneo, brevi v. usque 40μ longo; mesosporis numerosis immixtis.

Hab. in foliis culmibusque *Caricis sadoensis* FR.

Distrib. Hokkaido.

The related species *Puccinia lineariformis* is distinguished by its longer teleutospores with thinner apex, and also *P. dioicae* by smaller uredospores and thinner apex of teleutospores.

108. *Puccinia Caricis-pseudololiaceae* HOMMA, sp. nov.

Soris teleutosporiferis hypophyllis, oblongis v. rotundatis, 0.5-1.5 mm. diam., sparsis, brunneis; uredosporis immixtis globosis v. ellipsoideis, echinulatis, flavo-brunneis, $21-26 \times 13-23\mu$, poris germinationis 2 in parte sporae superiore oppositis; teleutosporis clavatis v. oblongis, apice rotundatis, valde incrassatis (usque 16μ), basi attenuatis, medio modice constrictis, levibus, brunneis, $37-62 \times 15-23\mu$; pedicello persistenti, flavido, usque 27μ longo.

Hab. in foliis *Caricis pseudololiaceae* FR. SCHM.

Distrib. Saghalin.

Comparing with the species of which uredospores have 2 germ-pores over the aequatorial plane, this fungus differs in the teleutospores with thicker apex.

109. *Puccinia Caricis-rhizopodae* MIURA, sp. nov.

? *Puccinia Caricis-tricostylis* (non DIETEL 1905) DIETEL, Ann. Myc. VIII, p. 305, 1910.

Soris uredosporiferis amphigenis, plerumque hypophyllis, sparsis v. aggregatis, diu epidermide tectis; uredosporis globosis v. irregularibus, echinulatis, flavo-brunneis, $21-30 \times 14-20\mu$, poris germinationis duobus in parte sporae superiore sitis.

Soris teleutosporiferis plerumque hypophyllis, rotundatis v. elongatis, 1-2 mm. longis, sparsis v. aggregatis, primo epidermide tectis, dein nudis, atris; teleutosporis clavatis v. fusiformibus, apice rotundatis v. conico-attenuatis, valde incrassatis (usque 9.5μ), basi attenuatis v. rotundatis, medio constrictis, levibus, flavo-brunneis, $47-65 \times 14-20\mu$; pedicello persistenti, flavido, $44-50\mu$ longo.

Hab. in foliis *Caricis rhizopodae* MAXIM. f. *longioris* MAXIM.

Distrib. Shikoku.

The constriction at the septum of the teleutospores is stronger than that of the related species, *Puccinia extensicola*, *P. Caricis-pseudololiaceae*, *P. shikokiana*, *P. silvatica* and *P. Caricis-trichostylis*.

110. *Puccinia Caricis-Maximowiczii* HOMMA, sp. nov.

Soris uredosporiferis hypophyllis, rotundatis v. oblongis, saepe confluentibus, 0.5 mm. longis, seriatim dispositis, flavo-brunneis; uredosporis globosis, raro ellipsoideis, echinulatis, flavo-brunneis, $26-32 \times 22-29\mu$, poris germinationis 4 v. 5 fere aequatorialibus praeditis; paraphysibus numerosis, clavatis, hyalinis.

Soris teleutosporiferis hypophyllis, rotundus, saepe in lineas confluentibus, 1-10 mm., rarius usque 40 mm. longis, pulvinatis, compactis, brunneis; teleutosporis variabilibus, aliis fusoideis v. oblongis, apice conoideis, incrassatis ($6-10\mu$), basi leniter attenuatis, flavidis, $45-64 \times 11-15\mu$, aliis clavatis, apice rotundatis, valde incrassatis ($13-16\mu$), basi plerumque rotundatis, brunneis, $40-48 \times 16-21\mu$, medio constrictis, levibus; pedicello subhyalino, persistenti, usque 60μ longo.

Hab. in foliis *Caricis Maximowiczii* MIQ.

Distrib. Hokkaido, Honshu.

From the character of the germ-pores of uredospores, this species somewhat relates to *Puccinia nonensis*, but it differs in the narrower teleutospores.

111. *Puccinia Taganesuge* MIURA, sp. nov.

Soris uredosporiferis hypophyllis, minutis, rotundatis, ca. 0.2 mm. diam.,

sparsis, diu epidermide tectis, brunneolis; uredosporis subglobosis v. ellipsoideis, aculeatis, flavidis v. brunneolis, $33-38 \times 30-34\mu$, poris germinationis obscuris; episporio $5-6.5\mu$ crasso.

Soris teleutosporiferis conformibus; teleutosporis clavatis v. oblongis, apice conico-attenuatis, valde incrassatis ($8-12\mu$), basi attenuatis v. rotundatis, medio leniter constrictis, levibus, flavis, $44-51 \times 21-26\mu$; pedicello persistenti, flavido, usque 36μ longo.

Hab. in foliis *Caricis siderostictae* HANCE.

Distrib. Hokkaido, Honshu, Shikoku.

Hitherto known species parasitic on *Carex siderosticta* in Japan are *Puccinia Miyakei*, *P. mandshurica*, *P. Caricis-siderostictae* and *P. hyalina*. The present species differs from the first by the larger teleutospores, from the second by the broader teleutospores with undevided apex, and from the third and forth by the larger uredospores.

112. *Puccinia Caricis-conicae* HOMMA, sp. nov.

Puccinia sikokiana (non DIETEL), SYDOW, Ann. Myc. XI, p. 104, 1913.

Soris uredosporiferis amphigenis, minutis, rotundatis, $0.3-0.5$ mm. diam., sparsis v. seriatim dispositis, brunneolis; uredosporis globosis v. ovatis, echinulatis, hyalinis v. flavidis, $31-39 \times 23-37\mu$, poris germinationis obscuris; episporio $4-5\mu$ crasso; paraphysibus intermixtis.

Soris teleutosporiferis plerumque hypophyllis, rotundatis v. oblongis, $0.5-1$ mm. longis, sparsis v. seriatim dispositis, epidermide tectis, dein nudis, atrop-brunneis; teleutosporis clavatis v. fusoides, apice truncatis, rotundatis v. conoideis, valde incrassatis ($13-20\mu$), basi rotundatis v. leniter attenuatis, medio modice constrictis, levibus, brunneis, $52-84 \times 17-28\mu$; pedicello persistenti, hyalino v. flavido, usque 42μ longo.

Hab. in foliis *Caricis conicae* BOOTT.

Distrib. Hokkaido.

This fungus was identified with *Puccinia sikokiana* by SYDOW, but it differs by the larger teleutospores and thicker-walled, globular, larger uredospores.

113. *Puccinia Caricis-okushiriensis* HOMMA, sp. nov.

Soris uredosporiferis plerumque hypophyllis, minutis, rotundatis, ca. 0.3 mm. diam., sparsis, brunneis; uredosporis late ellipsoideis v. globosis, echinulatis, hyalinis v. flavidis, $31-36 \times 25-29\mu$, poris germinationis obscuris; episporio ca. 4μ crasso.

Soris teleutosporiferis plerumque hypophyllis, minutis, rotundatis, $0.3-0.8$ mm. diam., sparsis, brunneis; teleutosporis oblongis v. fusiformibus, apice obtuse

angustatis v. conoideis, valde incrassatis ($13-18\mu$), basi rotundatis v. leniter attenuatis, medio non v. vix constrictis, levibus, flavo-brunneis, $44-72 \times 14-23\mu$; pedicello persistenti, flavido, usque 90μ longo.

Hab. in foliis *Caricis okushiriensis* AKIYAMA.

Distrib. Hokkaido.

114. *Puccinia hyalina* DIETEL emend. HOMMA.

(Status uredosporiferus non *Uredo hyalina* DIETEL)

Soris uredosporiferis hypophyllis, minutis, rotundatis, sparsis, diu epidermide tectis, flavo-brunneis; uredosporis ovatis v. ellipsoideis, echinulatis, flavidis, $18-25 \times 16-21\mu$, poris germinationis obscuris.

Status teleutosporiferus = *Puccinia hyalina* DIETEL, in ENGL. Bot. Jahrb. XXXVII, p. 99, 1905—Sacc. Syll. XXI, p. 681.

Hab. in foliis *Caricis siderostictae* HANCE.

Distrib. Honshu, Shikoku.

The uredospores of the present fungus differs from *Uredo hyalina* DIETEL in the smaller size and thinner wall. The uredospores of the latter fungus are $33-38 \times 26-36\mu$ in size and their wall $3-6\mu$ thick.

115. *Puccinia Hommae* S. Ito, sp. nov.

Soris amphispোরiferis hypophyllis, rotundatis, sparsis, mox nudis, intense brunneis; amphispোরis ovatis, obovatis v. ellipsoideis, flavo-brunneis v. brunneis, levibus, $22-45.5 \times 13-21\mu$, poris germinationis 3 fere aequatorialibus praeditis; episporio ca. 5.2μ crasso; teleutosporis immixtis oblongis v. clavatis, apice obtuse angustatis v. rotundatis, incrassatis ($5-8\mu$), basi attenuatis, raro rotundatis, medio leniter constrictis, levibus, brunneis v. flavo-brunneis, $39-57 \times 14-23.5\mu$; pedicello persistenti, flavido, $20-26\mu$ longo.

Hab. in foliis *Caricis capillaceae* BOOTT.

Distrib. Hokkaido.

The amphispores and teleutospores of this fungus are smaller than those of *Puccinia xenosperma*.

The species was named in honour of Dr. YASU HOMMA by the senior author who was much obliged to her constant assistance on his mycological works.

116. *Puccinia Cyperi-pilosi* HOMMA, sp. nov.

Puccinia Cyperi (non ARTHUR) HIRATSUKA et YOSHINAGA, Mem. Tottori Agr. Coll. III, p. 316, 1935, p.p.

Soris uredosporiferis hypophyllis, oblongis v. linearibus, sparsis v. seriatim dispositis, diutius epidermide tectis, pulvinatis, brunneis; uredosporis subglobosis

v. ovatis, verrucosis, flavo-brunneis, $23-29 \times 21-23\mu$, poris germinationis 2, interdum 3 praeditis; paraphysibus intermixtis.

Soris teleutosporiferis hypophyllis, sparsis v. subaggregatis, epidermide tectis, atro-brunneis; teleutosporis subfusoides, apice conico-attenuatis, incrassatis ($4-9\mu$), basi plerumque attenuatis, medio modice constrictis, levibus, brunneolis, $49-75 \times 17-21\mu$; pedicello flavo-brunneo, persistenti, $18-23\mu$ longo.

Hab. in foliis *Cyperi pilosi* VAHL.

Distrib. Shikoku.

By the presence of the paraphyses in the uredosori, the present species is quite different from *Puccinia Cyperi*.

117. *Puccinia Kyllingiae-brevifoliae* MIURA, comb. nov.

Status uredosporiferus = *Uredo Kyllingiae-brevifoliae* DIETEL, in ENGL. Bot. Jahrb. XXXIV, p. 591, 1905—SACC. Syll. XXI, p. 806.

Teleutosporis in soris uredosporiferis evolutis, oblongo-clavatis, oblongis v. fusoides, apice rotundatis v. obtuse angustatis, raro papillis ornatis, incrassatis ($4-8\mu$), basi attenuatis v. rotundatis, medio leniter constrictis, levibus, hyalinis v. flavidis, $40-52 \times 13-20\mu$; pedicello persistenti, flavido, usque 30μ longo.

Hab. in foliis *Kyllingiae brevifoliae* ROTTB.

Distrib. Shikoku, Kyushu, Formosa.

Contributions to the Flora of Northern Japan X

By

Kingo MIYABE and Misao TATEWAKI

(宮部金吾・館脇操)

With 4 text-figures

176. *Sabina Sargentii* (TAKEDA) MIYABE ET TATEWAKI, com. nov.

Juniperus chinensis L. var. *Sargentii* HENRY, in ELWES & HENRY, Tr. Br. & Irl. VI. (1912), 1432; MIYABE & KUDO, Fl. Hok. & Saghal. I. (1929), 77.

Juniperus Sargentii TAKEDA, ex KOIDZ. in Bot. Mag. Tokyo, XXXIII. (1919), (204), nom. nud.; NAKAI, ibid. XLIV. (1930), 511; KOMAR. Fl. URSS. I. (1934), 188.

NOM. JAP. *Miyama-haibyakushin*, *Shimpaku*.

DISTRIB. Saghalien, S. Kuriles, Yezo, Honshu, Shikoku and Korea.

177. *Betula Yoshimurae* MIYABE ET TATEWAKI, sp. nov.

Frutex, ramulis novellis glanduliferis sublente puberulis, punctis resinosis dense obsitis. Squamae gemmarum glabrae, ciliatae. Folia ovata vel elliptico-ovata, denticulata vel duplicato-denticulata, 2-3 cm longa, 1.5-2.3 cm lata, utrinque 4-5-nervata, apice obtusa vel acuta vel acutiuscula, basi late cuneata vel subrotundata, supra sparse pilosula et ad nervum tenuissime pilosiuscula, subtus pallidiora et plerumque eglandulosa, glabrescentia, interdum ad nervum medium parce adpresse pilosa, axillis nervorum subnudis. Petioli supra pube sublente brevissima obtecti, subtus glabriusculi, ca. 3 cm longi. Strobilus oblongo-subcylindricus, 15 mm longus, 5-7 mm in diametro, erectus, breviter pedunculatus, pedunculis 4-8 mm longis, basi plerumque foliis 2-3 fultis. Squamae obovato-cuneatae, 3.5-4.0 mm longae, 2.6-3.5 mm latae, trifidae; lobi ciliati eglandulosi, lobis lateralibus erecto-patentibus oblongo-ovatis apice obtusis vel rotundatis 1.2-1.6 mm longis 0.7-1.0 mm latis, lobo intermedio oblongo laterali-bus paullo longiore 1.7-2.0 mm longo 0.7-0.9 mm lato. Nuculae ellipticae, 1.8-2.0 mm longae, ca. 1.0 mm latae, summo apice sublente puberulae; alae nuculae latiores vel subaequantes.

NOM. JAP. *Rukutama-kamba*. (n. n.)

HAB. *S. Saghalien*. Distr. Shikka: The upper Rukutama (B. YOSHIMURA & M. HARA, VII. 14, 1937-type in Herb. Fac. Agr. Hokkaido Imp. Univ.).

Remarks. The present species is closely related to *Betula Middendorffii* and *Betula ovalifolia*. But it is distinguished from the former by the ovate leaves with acutish apex, of which the underside is not resinous-punctate in the adult stage and also by the erect catkin; and from the latter by the leaves, of which the underside is not resinous-punctate and by the broader wings of the seed. The present species resembles also *Betula fruticosa*, from which it differs by the narrower wings of the seed and the puberulous branchlets.

178. *Carpinus erosa* BL. var. *pseudo-japonica* MIYABE ET TATEWAKI, com. nov.

Carpinus cordata Bl. var. *pseudo-japonica* H. WINKL. in ENGL. Bot. Jahrb. L. Suppl. (1914), 490; INOKUMA & MOMIYAMA, Mat. Jap. Dendr. I. (1937), 22, fig. 1, 2.

NOM. JAP. *Oh-sawashiba*.

HAB. *Yezo*. Isl. Okushiri, Prov. Shiribeshi: Tsurikake (M. TATEWAKI, n. 21384, V. 22, 1935; KINGO TOGASHI, VII. 24, 1935); Chatsu (KINGO TOGASHI, V. 30, 1935); Senjo (KINGO TOGASHI, V. 21, 1935).

DISTRIB. *Yezo* and N. Honshu.

179. *Ulmus laciniata* MAYR, Fremd. Wald- u. Park-b. (1906), 523, f. 243.

var. *laevigata* INOKUMA, in INOKUMA & MOMIYAMA, Mat. Jap. Dendr. I. (1937), 28.

form. *yezoensis* MIYABE ET TATEWAKI, form. nov.

Folia supra glabra, laevia, subtus scabrida, ad costas nervos venulisque sparse pilosa, pilis brevibus, et praeter in venarum axillis cinereo-barbulata.

NOM. JAP. *Yezo-no-teruha-ohyo*. (n. n.).

HAB. *Yezo*. Prov. Oshima: Mt. Yokotsudake (F. C. GREATREX, VI. 26, 1916).

Remarks. On account of the smooth glabrous upper surface, and barbulate axils of the under surface of the leaf, the present plant may be taken as a form of var. *laevigata* INOKUMA, from which it differs by the sparingly short-pilose and scabrous nerves and veinlets beneath. In the latter characters, our plant resembles var. *nikkoensis* REHDER.

180. *Reynoutria japonica* HOUTT., Handl. VIII. (1777), 640, t. 51, fig. 1; OHKI, in Bot. Mag. Tokyo, XL. (1926), 49, (var. *typica*); NEMOTO, Fl. Jap. Suppl. (1936), 179.

Polygonum cuspidatum SIEB. ET ZUCC. Fam. Nat. II. (1846), 84; MEISN. in DC. Prodr. XIV. (1856), 136; FRANCH. ET SAV. Enum. Pl. Jap. I. (1875), 402; MATSUM. Ind. Pl. Jap. II.-2. (1912), 56.

Polygonum Reynoutria MAKINO, in Bot. Mag. Tokyo, XV. (1901), 84; MAKINO & NEMOTO, Fl. Jap. ed. 2, (1931), 262.

NOM. JAP. *Itadori*.

HAB. *Yezo*. Prov. Oshima: Fukuyama (M. TATEWAKI, T. YAMANAKA & B. YOSHIMURA, VII. 25, 1936).

DISTRIB. *Yezo*, Honshu, Shikoku, Kyushu and Formosa.

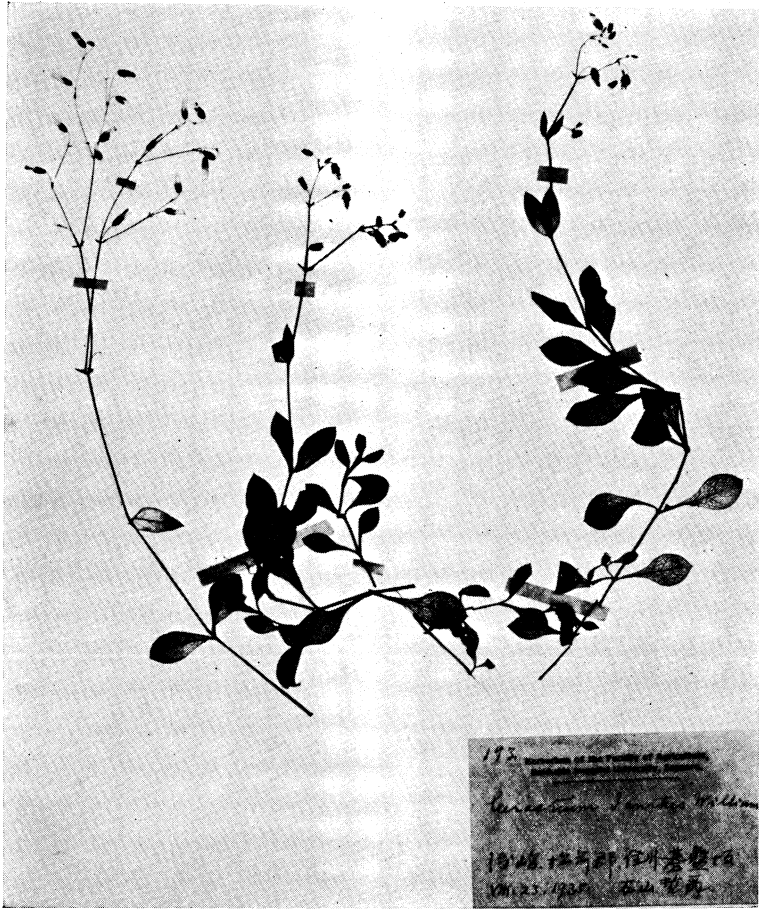
Remarks. New to the flora of Hokkaido and Saghalien.

181. *Cerastium Ianthès* WILLIAMS, in Bull. Herb. Boiss. VII. (1899), 131.

NOM. JAP. *Matsumaye-miminagusa*. (n. n.).

HAB. *Yezo*. Prov. Oshima: Matsumaye-gun, between Sumikawa and Gobanzaka (T. ISHIYAMA, VII. 1935). Coast of Japan (CHARLES WRIGHT, 1854).

Remarks. Our plant from Matsumaye-gun agrees very well with the description of the present species. As shown in the accompanying figure, it may be an annual plant with slender delicate stems, loose spreading inflorescence and broad prominently apiculate leaves. Petals are oblanceolate, bilobed,

Fig. 1. *Cerastium Ianthes* WILLIAMS

glabrous at base, and shorter than calyx. Seeds have rugose tubercles. TAKEDA⁽¹⁾ on examining the original specimen at the Kew Herbarium, regarded *Cerastium Ianthes* WILLIAMS as a weak form of *Cerastium triviale* var. *glandulosum*. It is doubtless most closely related to the latter species.

182. *Cerastium mitsumorense* MIYABE ET TATEWAKI, sp. nov.

Cerastium ciliatum HONDA, in YAMAMOTO & TSUKAMOTO, Fl. Hakodate, (1932), 207, (non TURCZ.)

Perenne. Caulis caespitosus, 15–20 cm altus, adscendens, gracilis, saepe

(1) Bull. Miscell. Inform. Kew, (1911), 103.

ramis sterilibus dispositus, basi divisus, in parte suprema dense pilosus, pilis eglandulosis patentibus; linea 1, hirsuta. Folia caulina uninervia, apice apiculata, margine ciliata, utrinque glabrescentia vel pilosiuscula; inferiora lineari-lanceolata, 2.0-2.5 cm longa, ca. 4 mm lata; media et superiora anguste lanceolata. Folia caudiculatorum sterilium oblanceolato-linearia. Dichasium 3-6-florum. Pedicelli pubescentes, pilis glandulosis parcissime immixtis. Bracteae glabrescentes vel hirsutiusculae, margine ciliatae; infimae foliaceae, ovato-lanceolatae; superiores minores, margine interdum submembranaceae. Sepala ca. 4.5 mm longa, elliptico-lanceolata, apice obtusa, hirsuta, margine late scariosa. Petala lanceolata, ca. 8 mm longa, 2 mm lata, quadrante bifida, lobis anguste ovatis apice obtusis, unguibus glabris.

NOM. JAP. *Mitsumori-miminagusa*. (n. n.).

HAB. *Yezo*. Prov. Oshima: Mt. Mitsumori (K. TSUKAMOTO, n. 46, VI. 1, 1924-type in Herb. Fac. Agr. Hokkaido Imp. Univ.).

Remarks. The present species is related to *Cerastium Takedae* HARA, from which it differs by the non-glandulose-hairy stem, the narrower leaves, the sterile branches with the linear-oblanceolate leaves and also by the shape of petals.

183. *Cerastium Tatewakii* MIYABE, sp. nov.

Perenne. Caulis caespitosus, gracilis, ascendens, distanter foliatus, 30 cm altus, basi hirsutus, superne pilis glandulosis dense obsitus. Folia basilaria obovato-spathulata, apice obtusa et apiculata, basi subito angustata et in alato-petiolem attenuata, utrinque adpresse hirsuta, margine ciliata, 20-33 mm longa, 6-12 mm lata. Folia caulina ovato-elliptica, apice acuta vel apiculata, sessilia, basi rotundata, utrinque sparsi-hirsuta, margine ciliata, 33-35 mm longa, 14-15 mm lata. Dichasium plerumque multiflorum, ramis longe pedunculatis. Pedicelli fructiferi recto-subpatuli, apice incurvati; pedicelli centrales calycem superantes. Bracteae infimae ovato-ellipticae, foliaceae; superiores minores, margine anguste membranaceae. Sepala elliptico-lanceolata, 5-6 mm longa, apice acuta, margine late scariosa, partibus viridibus glanduloso-hirsutis. Petala oblongo-elliptica, integra, basi glabra vel ciliolata, calyce $\frac{1}{3}$ breviora. Filamenta glabra. Capsula calyce subduplo longior, dentibus rectis margine revolutis. Semina ovato-globosa, in costis obscuris tuberculata.

NOM. JAP. *Ketoi-miminagusa*. (n. n.)

HAB. *Middle Kuriles*. Urup: Iyema (S. ITAGAKI, V. 1928). Ketoi: Minamiura (M. TATEWAKI & K. TAKAHASHI, n. 15791, VII. 28, 1929—type in Herb. Fac. Agr. Hokkaido Imp. Univ.; n. 15500, VIII. 20, 1929); Shimizugawa (M. TATEWAKI & K. TAKAHASHI, n. 15610, VIII. 27, 1929).

DISTRIB. Endemic.

Remarks. In the character of the entire petals, the present species is related to *Cerastium pauciflorum* STEV. (*C. pilosum* LEDEB.) and *Cerastium falcatum* BUNGE. But it is easily distinguished from them by the smaller size of the petal, and moreover the plant belongs to Subgen. *Orthodon* and not to *Strephodon*. The present species is named after Dr. MISAO TATEWAKI.

184. *Hydrangea paniculata* SIEB. in Acta Phys. Med. Acad. Caes. Leop. Carol. XIV.-2. (1829), 691; NAKAI, in Bot. Mag. Tokyo, XL. (1926), 466.

var. *thermalis* MIYABE ET TATEWAKI, var. nov.

Rami graciles. Folia opposita, parva, laminis oblongis oblongo-ovatis vel obovato-oblongis 2.5-5.5 (-6.0) cm longis 1.0-2.5 cm latis. Inflorescentia depresso-paniculata. Sepala floris sterilis marginalis 3-6, elliptica vel oblonga, 0.5-1.3 cm longa 0.3-0.8 cm lata, purpurascencia.

NOM. JAM. *Kawayu-noriutsugi*. (n. n.).

HAB. *Yezo*. Prov. Kushiro: Kawayu Hot-spring (M. TATEWAKI, n. 1992, VIII. 11, 1933).

185. *Viola crassa* MAKINO, in Bot. Mag. Tokyo, XIX. (1905), 87.

var. *shikkensis* MIYABE ET TATEWAKI, var. nov.

Rhizoma repens, crassum, 3 mm latum. Caulis 2-4 apice rhizomatis caespitosus, saepe 3 foliatus, 1-2 floratus, superne glabrus. Folia radicalia petiolata, petiolis glabris 3.5-5.0 cm longis; stipulae hypogaeae pallide fuscae, membranaceae, oblongo-ellipticae, integrae, 5 mm longae, 3 mm latae; lamina subchartacea, late reniformis, apice truncata vel leviter emarginato-truncata, margine incurvate crenato-serrata, ca. 3 cm longa, ca. 4 cm lata, utrinque viridis, supra ad nervum hispidulo-puberula. Folia caulina petiolata, petiolis 0.5-5.0 cm longis; stipulae oblongae vel ovato-oblongae, ca. 4 mm longae, ca. 2 mm latae; lamina foliorum radicalium conformis sed minor. Pedunculi axillares, solitarii, brevissime puberuli, 1-4 cm longi, supra medium bibracteati; bractae lanceolatae, oppositae, 2 mm longae, integrae. Sepala exteriora ovato-elliptica, 4.0-4.2 mm longa, ca. 2 mm lata; interiora oblongo-lanceolata, 5-6 mm longa, 1.5-2.0 mm lata, appendice breve truncato. Petala flava, ca. 12 mm longa, superiora et lateralia oblongo-obovata, infima obovata, apice rotundata, calcari brevissimo ca. 1 mm longo obtuso. Ovarium globosum, glabrum. Styli tubulosi, basi leviter geniculati, apice stigmatosi, bifidi.

NOM. JAP. *Karafuto-takanesumire*. (n. n.).

HAB. *S. Saghalien.* Distr. Shikha: Kotannoshike, Kitashiretoko Penins. (S. SUGAWARA, VII. 24, 1935).

Remarks. The present variety is distinguished from *Viola crassa* MAKINO and its variety *vegeta* NAKAI by the wider sepals and bracts and also by the glabrate pedicels.

186. *Bupleurum Yokoyamae* MIYABE ET TATEWAKI, sp. nov.

Caulis solitarius, erectus, 60–120 cm altus, teres, subtiliter striatus, late fistulosus, viridis, remote foliosus, ramosus, ramis tenuibus elongatis. Folia supra viridia, subtus subglabrescentia, anastomosantia, venis nervi patulis usque erecto-patentibus remotis arcuatis. Folia inferiora sensim in petiolum planicum late alatum et basi vaginam amplexicaulem angustata, laminis oblanceolatis; folia caulina media sessilia, oblanceolata, apice acuta vel acuminata, basi auriculato-amplexicaulia, 11–25 cm longa, 1.8–3.5 cm lata, ca. 7 nervia; superiora subconformia sed minora. Umbellae terminales, pedunculis tenuibus longis suffultae, 3–8-radiatae, radiis elongatis gracilibus subangulosis inaequalibus 3.5–5.0 cm longis, interioribus erectis, exterioribus leviter curvatim ascendentibus. Phylla involucri 3–4, viridia, lanceolata vel anguste ovato-lanceolata, 5–6 mm lata, 1.5–2.0 mm lata, apice acuta. Phylla involucelli vulgo 5, subaequalia, lanceolata vel lineari-lanceolata, 3–4 mm longa, ca. 1.0–1.5 mm lata, apice acuta, umbellulis 8–13-floris. Pedicelli filiformes, inaequilongi, 4–7 mm longi. Petala inflexa, apice emarginata, ovato-rhomboida, 1 mm longa, 0.8 mm lata. Fructus oblongo-ellipticus vel ellipticus, brunneo-nigricans, pedicelis 2–3 plo brevior; mericarpia transverse subpentagona; pericarpium tenue; vittae valliculares ternae vel quaternae.

NOM. JAP. *Tokachi-saiko.* (n. n.).

HAB. *Yezo.* Prov. Tokachi: the upper Kogawa, Toyokoro (H. YOKOYAMA, VIII. 15, 1937—type in Herb. Fac. Agr. Hokkaido Imp. Univ.).

Remarks. The present species is related to *Bupleurum longifolium* L. and *Bupleurum longiradiatum* TURCZ. But it differs from the former by the elongated branches, the narrower leaves, the longer peduncles and also by the lanceolate bracts; while it is easily distinguished from the latter by the venation of the leaves.



Fig. 2. *Bupleurum Yokoyamae* MIYABE ET TATEWAKI

187. *Trientalis europaea* L. Sp. Pl. ed. 1, (1753), 344; PAX u. KNUTH, in ENGL. Pfl.-reich. IV.-237. (1905), 313.

var. *ramosa* MIYABE ET TATEWAKI, var. nov.

? *Trientalis ramosa* KOIDZ. in Bot. Mag. Tokyo, XLIII. (1929), 386;

MAKINO & NEMOTO, Fl. Jap. ed. 2, (1931), 912.

Caulis 13 cm altus, ramosus, ramis fasciculato-foliatis, foliis oblongo-ellipticis ca. 3.5 cm longis ca. 1 cm latis, pedunculo 3-4 cm longo. Cetera ut in typo.

NOM. JAP. *Edauchi-tsumatoriso*. (n. n.).

HAB. *S. Saghalien*. Distr. Motodomari: Bakenuma (N. SHIRASAKA, VII. 21, 1935).

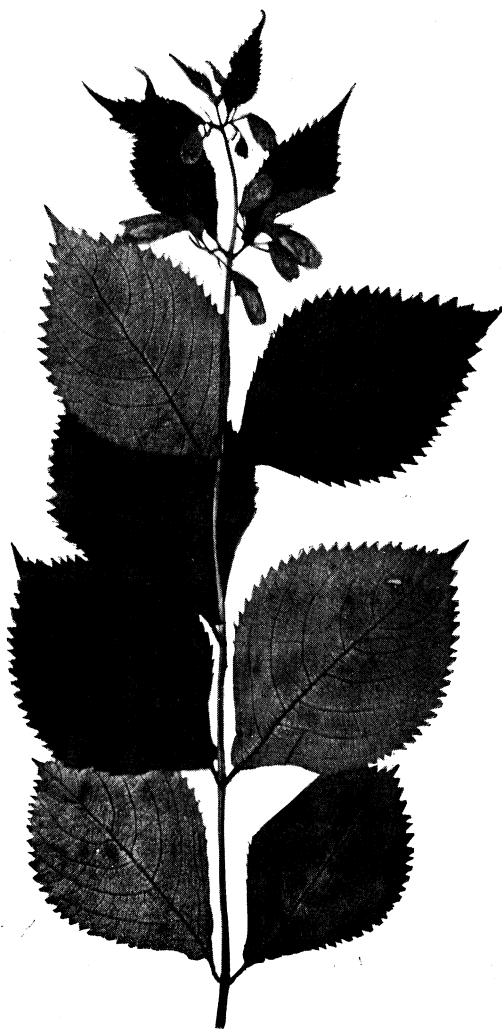


Fig. 3. *Chelonopsis moschata* MIQ.
var. *jessoensis* MIYABE ET TATEWAKI

188. *Chelonopsis moschata* MIQ. var. *jessoensis* MIYABE ET TATEWAKI, com. nov.

Chelonopsis Yagiharana HISAUCHI ET MATSUNO, var. *jessoensis* KOIDZ. Fl. Symb. Or.-As. (1930), 16.

Caulis simplex, adscendens, pilosiusculus, ad 40 cm altus. Folia breviter petiolata, petiolis hirsutis supra barbato-hirsutis ca. 5 mm longis; lamina ovata vel late ovata, 9-12 cm longa, ca. 8 cm lata, ciliata, apice acuminata vel acuminate-cuspidata, basi subito cuneatim attenuata et leviter auriculato-cordata, supra subhirsuta, subtus pallida, ad nervos hirsuta, pilis longioribus horizontaliter patentibus immixta, margine dentato serrata, serratulis patentibus cuspidato-acuminatis apice cuspidatis. Cymae 3-4-florae, bracteis lanceolato-linearibus hirsutis ca. 7 mm longis, pedunculis 5 mm longis hirsutis, pedicellis 6-10 mm longis hirsutiusculis. Calyx campanulatus, bilabiatus, utrinque hirsuto-pilosus, ca. 1.2 cm longus, labio superiore tridentato, dentibus anguste deltoidibus, dente medio longissimo, inferiore bidentato, dentibus anguste deltoidibus aequilongis.

NOM. JAP. *Hiroha-jakoso*. (n. n.).

HAB. *Yezo*. Prov. Oshima: Hirokawara, at the foot of Mt. Sengen (T. ISHIYAMA, VIII. 8, 1935).

Remarks. The present variety differs by the shape of the broader leaves and their dentation from the typical form of *Chelonopsis moschata* MIQ., to which it is most closely related; but compared with *Chelonopsis Yagiharana* HISAUCHI ET MATSUNO, it has so many important points of difference as it is difficult to find any close affinity between them.

189. *Paris hexaphylla* CHAM.: MIYABE & KUDO, Fl. Hok. & Saghal. III. (1932), 341.

form. *purpurea* MIYABE ET TATEWAKI, form. nov.

Sepala purpurea. Cetera ut in typo.

NOM. JAP. *Murasaki-kurumaba-tsukubaneso*. (n. n.).

HAB. *Yezo*. Prov. Kushiro: Kutcharo (M. TATEWAKI, n. 25183, V. 31, 1936).

190. *Trillium amabile* MIYABE ET TATEWAKI, sp. nov.

Caulis 40-60 cm altus, glaber. Folia late ovato-rhomboidea, glabra, sessilia, apice subito acuminata vel acuta, basi truncato-cuneata, 12-14 (-16) cm longa, 13-18 (-20) cm lata. Pedicelli erecti, 5-7 cm longi, in postfloratione fere ad 8 cm longitudine accrescentes. Flores ca. 5 cm in diametro. Sepala late lanceolata vel oblongo-lanceolata, 2.5-3 cm longa, ca. 1.2 cm lata, apice acutiuscula, margine fere purpurascencia. Petala rotundata vel rotundato-ovata, purpurea,

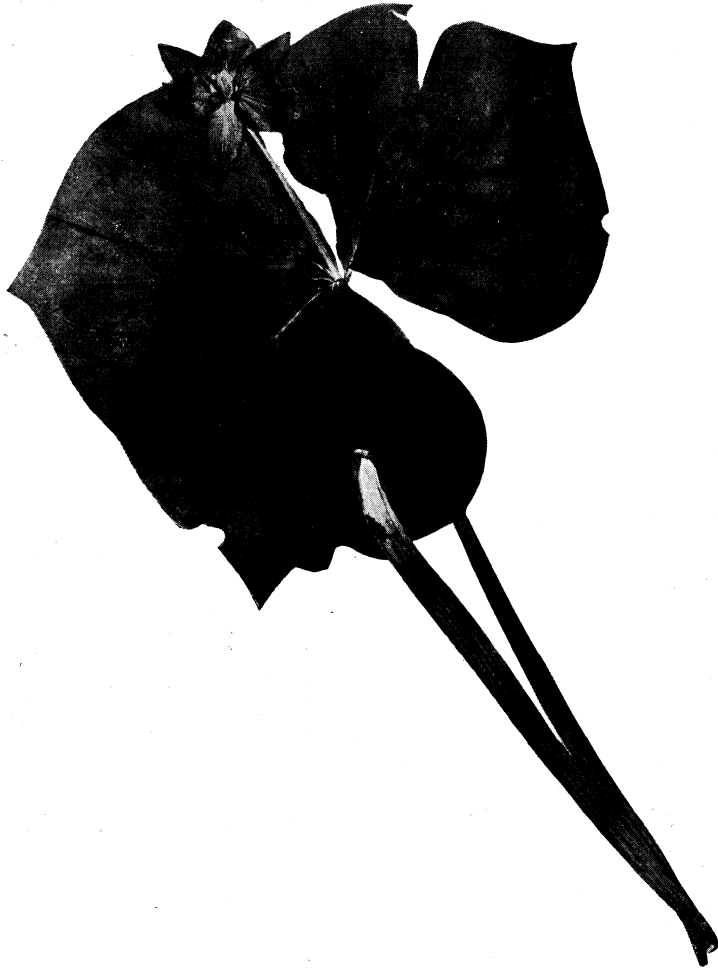


Fig. 4. *Trillium amabile* MIYABE ET TATEWAKI

sepala subaequantia vel iis paullo breviora, ca. 2 cm longa lataque, apice rotundata vel obtusiuscula. Filamenta brevía, purpurea, 1-2 mm longa. Antherae 6-7 mm longae purpureae. Ovarium subglobosum, flavo-albidum, apice atrorubens, 7 mm longum.

NOM. JAP. *Kojima-enreiso*. (n. n.).

HAB. *Yezo*. Prov. Oshima: Isl. Kojima (M. TATEWAKI, n. 20768, V. 17, 1937—type in Herb. Fac. Agr. Hokkaido Imp. Univ.).

Remarks. The present species is intermediate in character between *Trillium kamtschaticum* PALL. and *Trillium Smallii* MAXIM. It is distinguished

from the former by the shape of the broader leaves, the shorter purple petals, the shorter anthers and also by the smaller subglobose ovary; while it is distinguished from the latter by the shape of the leaves and by the broad lanceolate larger sepals and the shorter filaments. The writers wish to express their thanks to Prof. H. MATSUURA and Mr. T. HAGA who have most kindly furnished us with the information that the plant has cytologically the intermediate character between *Trillium kamtschaticum* and *Trillium Smallii*.

摘 要

北日本植物誌料十

176. ミヤマハヒビヤクシン 屬名の變更に依る新組合。
177. ルクタマカンバ (新種) 大陸に分布する *Betula ovalifolia* に最も近きも、果實の翼の幅廣く、成葉の裏面殆ど油點なき新種にして、樺太敷香支廳留久玉川上流にて吉村文五郎、原松次兩氏採集す。
178. オホサハシバ 後志國奥尻島の産。
179. エソノテリハオヒョウ (新品種) テリハオヒョウに比するに裏面は粗糙、葉脈上に有毛、殊に脈腋に灰色の毛叢を有する品種にして、渡島國横津岳にてグレートレックス氏採集す。
180. イタドリ 北海道植物に新追加、渡島國福山の産。
181. マツマヘミミナグサ ミミナグサに近きも第一圖の如き植物にして、渡島國松前郡にて石山哲爾氏採集す。
182. ミツモリミミナグサ (新種) タカネミミナグサに似たるも、莖に腺毛なく、莖葉は狭長、又花瓣の形狀を異にする新種にして、渡島國三森山にて故塚本角次郎氏採集す。
183. ケトイミミナグサ (新種) 花瓣全縁、萼片より短き異型の新種にして中部千島に産す。
184. カハユノリウツギ (新變種) 葉は小形にして花序も壓平せられ、不登花の萼片は小形にして細長く且帶紫色を呈す。釧路國川湯の産。
185. カラフトタカネスマレ (新變種) タカネスマレ及びオホタカネスマレに似たるも、萼片、苞片共に廣く、葉柄殆ど平滑の變品にして、樺太敷香支廳主毛にて菅原繁藏氏採集す。
186. トカチサイコ (新種) コガネサイコ類とは葉形、苞形を異にし、花梗長く、又ホタルサイコとは葉脈に依り直ちに區別することを得る新種にして、十勝國豊頃小川上流の溪谷にて横山春男氏採集す。
187. エダウチツマトリサウ 小泉教授のオホツマトリサウを小形にしたるが如き形態を有し、樺太化沼にて白坂信巳氏採集す。
188. ヒロハジャカウサウ 渡島國にジャカウサウに似て葉の廣き一品あり。千軒岳山麓にて石山哲爾氏の採集せる標本を検するに、アシタカジャカウサウより、ジャカウサウに近く、依つてジャカウサウの變種とせり。
189. ムラサキクルマバツクバネサウ (新品種) 萼片の紫色を呈せる品種にして、釧路國屈斜路湖畔に産す。
190. コジマエンレイサウ (新種) オホバナエンレイサウとは葉の幅廣く、花瓣紫色を呈し、萼短き事等に依り區別し得べく、又エンレイサウとは、花瓣を有し、萼片大にして廣披針狀を呈し、花絲の短き事に依り區別し得べし。渡島國西南の離島小島の産なり。

Bottom Fauna of Lake Abasiri and the Neighbouring Waters in Hokkaido¹⁾

By

Masuzo UÉNO

(上 野 益 三)

With 8 text-figures

Introduction

A number of lakes of various sizes and depths lie on the north-eastern Ochotsk sea coast of Hokkaido. The majority of these lakes are lagoons, and some of the larger ones are connected directly with the sea. Of the freshwater lakes, Abasiri-ko is the largest and is one of the most productive of piscivorous fishes among the lakes of Hokkaido. It was once investigated by the officials of the staff of the Hokkaido Fisheries Experiment Station (cf. TAKAYASU et al. 1930), but its bottom fauna was left unexplored. The present contribution deals with the bottom fauna not only of Abasiri-ko, but also of the Abasiri river, the effluent of the lake, and Mokoto-numa, a small lake lying some 8 km south-east of Abasiri-ko. These inland waters were studied from the end of August to the beginning of September, 1936. The bottom animals were collected in each case by using an EKMAN-BIRGE bottom-sampler which takes up the bottom mud over a surface area of 225 cm². The physical and chemical results obtained will be discussed in detail by Dr. YOSHIMURA in a separate paper.

The writer begs to offer his respectful thanks to the Hattori Hokokai for the grant which made the present study possible. The writer's thanks are also due to Dr. S. YOSHIMURA who collaborated with him and to Mr. Y. YAMASAKI for his kind assistance in doing the field work. For the identification of various groups of animals, the writer is indebted to Mr. T. KURODA (Mollusca, in part.), Mr. S. MORI (Mollusca, in part.), Mr. S. OKUDA (Polychaete Annelida), Dr. K. STEPHENSEN (Amphipoda-*Grandidierella*) and to Mr. H. YAMAGUCHI (Oligochaete Annelida).

I. Abasiri-ko (Lake Abasiri)

a) General Features of the Lake

Abasiri-ko occupies a large flat depression some 5 km south-west of the

1) Contribution from the Ôtsu Hydrobiological Station, Kyoto Imperial University.

Trans. Sapporo Nat. Hist. Soc., Vol. XV, Pt. 3, 1938.

Abasiri harbour, which in turn lies close to the coast of the Ochotsk Sea. The lake lies at $43^{\circ}54'-44^{\circ}N$, $144^{\circ}7'-144^{\circ}13'E$ and at an altitude of about 0.6 m. The entire depression in which the lake lies is surrounded by a series of terraces not higher than 200 m above the sea. The principal influent of the lake is the Abasiri-gawa (Abasiri river) which runs from the northern side of the Akan caldera (UÉNO 1936) at the southern end of the lake. The effluent which flows out at the north-east end and empties into the Ochotsk Sea is also called Abasiri-gawa.

Abasiri-ko is rather irregular in form, the shore-line being 40 km, the greatest length being about 11 km in the NE-SW direction. The area is 34.04 km². The maximum depth is 17.6 m at about the centre of the lake. At both ends of the main basin there is a bay, Yobito-wan in the north and

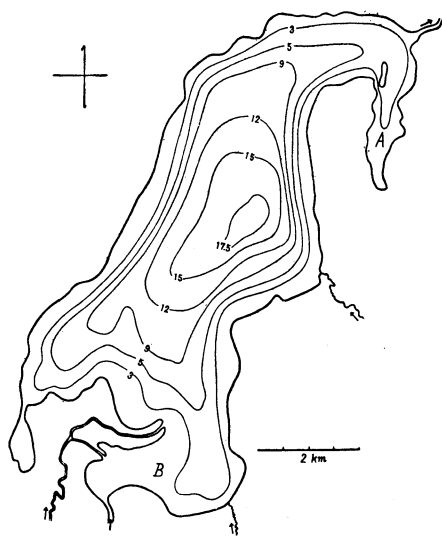


Fig. 1. Bathymetric map of Abasiri-ko.
A, Yobito-wan; B, Memanbetu-wan
Isobath in metres.

Memanbetu-wan in the south. These two gulfs and the main basin are somewhat different ecologically. The margin of the main basin is formed by sandy shores, but at several headlands especially in the north and west the water washes against a shore of rocky fragments. In the southern bay, south of the delta of the influent, there is an abundant growth of aquatic phanerogamic plants.

The littoral region may be said to extend from 0 to 6 m in depth, the sublittoral from 5-9 m to 12 m, and the profundal in those areas deeper than 12 m. The littoral region is well-developed, occupying nearly 50 % of the total

surface area of the lake. Both bays in the north and south may be regarded as littoral.

The mean monthly temperature at Abasiri harbour varies from -7.0°C in January to 16.7°C in July. The mean annual rainfall at the same place is about 800 to 1100 mm. Abasiri-ko is usually frozen over in the middle of December and loses its ice about the middle of April.

Bottom deposits. The bottom of the north bay, Yobito-wan, is covered with blackish brown mud, containing a rather large amount of allochthonous detritus, while in the south bay, Memanbetu-wan, the bottom mud is brown ochre and contains a large amount of fine sand. The bottom deposit of the main basin where the water is deeper than 4-5 m is blackish grey mud containing still fine sand to a depth of 10 m. The total nitrogen content of such a mud, estimated by the micro-Kjeldahl procedure, is 1.2%, which is about one-sixth of the "plankton nitrogen" (*sensu* BIRGE and JUDAY 1926) of the lake-water at that season. On the bottom of the central part of the lake deeper than 13-14 m there was found black cream-like soft mud which gave off an odor of hydrogen sulphide and contained no organic detritus. This kind of black mud is usually found in the coastal lakes, in which the water of higher salinity is stagnant in the deeper layer (cf. YOSHIMURA and MIYADI 1936). The origin and constitution of such peculiar deposits were fully discussed by MÜNSTER STRÖM (1936) in connection with a number of Norwegian lakes.

b) Physical and Chemical Results

The series of observations made by YOSHIMURA parallel to the writer's work is presented in Table I.

Hypolimnion was hardly recognized just above the bottom. Dissolved oxygen decreased rapidly below depths of 10 m, at 12 m being about $\frac{1}{3}$ of that of the surface, and in water deeper than 14 m entirely absent. The dichotomous stratification of pH, well-known in certain Japanese lakes, was also observed in this lake. The salinity of deep water is about half that of sea water and it is of interest that it corresponds to the area of black mud deposit described above. The water of the Ochotsk Sea may have flowed up the effluent into the lake during a heavy storm, the water of high salinity then stagnating on the deeper bottom. This is substantiated by the fact that certain bleached marine shells were taken from the deep bottom. On the basis of the chemical analysis of the water, Abasiri-ko is regarded as eutrophic, the water-bloom consisting chiefly of *Aphanizomenon flos-aquae* occurring in mid-summer.

TABLE I
Lake Abasiri. 29. VIII. 1936.

Depth in metres	Temp. °C	pH	O ₂ cc/l	O ₂ %	Chlorine g/l
0	23.70	7.7	6.16	103	0.198
1	23.30	—	—	—	—
2	22.67	7.6	—	—	—
3	22.36	7.5	5.59	91	—
4	22.30	7.3	—	—	—
5	22.26	7.1	5.33	87	0.185
6	22.00	7.1	—	—	—
7	21.61	7.0	—	—	—
8	21.58	7.0	5.50	88	—
9	21.04	6.8	—	—	—
10	20.14	6.6	3.87	60	0.137
11	18.98	6.6	—	—	—
12	18.41	6.5	2.23	34	2.6
13	14.19	7.0	0.08	1	—
14	9.78	7.3	0	0	—
15	7.06	7.5	0		9.9
16	6.32	7.5	0		10.5

Transparency: 2.9 m.

c) Bottom Fauna

i) *Composition of the bottom fauna.* The bottom fauna is composed of the following five groups of animals:

	%
Chironomidae (larvae and pupae)	47.0
Insect larvae other than Chironomidae	0.3
Crustacea	16.4
Mollusca	32.9
Oligochaeta	3.4
	100.0

The number of species is about 20, corresponding with those of the lakes of Honsyu and of the Southern Kuriles especially in the Island of Etorohu. The percentage composition of the mollusks is much higher than in any lakes south of Hokkaido, but they resemble those of the shallower lakes of Etorohu

and Hokkaido. The composition of the bottom fauna of the two lakes of Etorohu is cited below (cf. MIYADI 1933).

	Tosimoé-ko	Kimon-numa
	%	%
Chironomidae	54.1	45.1
Crustacea	—	—
Mollusca	33.4	38.5
Oligochaeta	12.5	16.4
	100.0	100.0

1. *Chironomidae* larvae. At least 6 species of chironomid larvae were found in the bottom mud. Of these, the larvae belonging to the Orthocladiariae were most widely distributed down to a depth of 7 m, their number per unit area (square metre) being estimated at more than 2100. The blood-red larva and pupa of *Chironomus plumosus* were also widely distributed, but much fewer in number (less than 300 per m²) than the preceding forms. The finding of this larva at a depth of 14.6 m is noteworthy because the bottom water close to the mud at such a depth is greatly contaminated by the presence of chlorine and hydrogen sulphide, as stated already. Besides those mentioned above, the larvae of Tanypodinae, *Tanytarsus*, *Sergentia* and *Glyptotendipes* were also found in small numbers.

2. *Crustacea*. Three species of malacostracan Crustacea inhabit the lake:
 Amphipoda—*Anisogammarus* (*Eogammarus*) *kygi* (DERSHAVIN)
 Isopoda —*Exosphaeroma oregonensis* DANA
 Mysidacea —*Neomysis intermedia* CZERNIAVSKY

Of these species, *Neomysis* is the most widely distributed over the bottom down to a depth of 10 m, at which the chlorine content of water is less than 1 g per litre. The numerical estimate generally shows less than 50 per m², but often as many as 264 per m². The other two crustaceans inhabit bottoms shallower than 2 m; *Anisogammarus* is usually fewer than 300 per m², while *Exosphaeroma* often exceeds 1600 per m². The latter species is readily adaptable to freshwater, it being found in certain habitats in the Abasiri river (see later chapter).

3. *Mollusca*. 12 species (determined by MORI) were found inhabiting the lake, most of them being bivalves.

1. *Pisidium* (*Eupisidium*) *cinereum nikkoense* MORI
2. *P.* (*E.*) *subtruncatum* MORI
3. *P.* (*E.*) *subtruncatum altus* ?
4. *P.* (*E.*) *pulchellum* JENYNS

5. *Anodonta arcaeformis* (HEUDE) (determined by KURODA)
6. *Ammicola* sp.
7. *Valvata piscinalis japonica* VON MARTENS
8. *V. cristata hokkaidoensis* MIYADI
9. *Anisus* (*Gyraulus*) *albus spirillus* (GOULD)
10. *Stenothyra* n. sp. (KURODA MS)
11. *Viviparus malleatus* (REEVE)
12. *Lymnaea* (*Radix*) *auricularia* ?

Most of these mollusks are found in the littoral region shallower than 4 m (usually 2 m). The only genus living on a deeper bottom is the *Pisidium* which is found down to a depth of 9 m. This genus is also the richest in individual numbers, often exceeding 800 per m² in the shallow bottom of 2 m. *Anisus* is found also in shallow regions especially among luxurious growths of aquatic phanerogams, it being estimated as 100-300 per m². *Valvata* is restricted to the bottoms shallower than 3 m, and reaches 700 or more individuals per m². The variety of Mollusca rich both in species and individual numbers is one of the outstanding characteristics of the bottom fauna of the lake.

4. Oligochaeta. *Limnodrilus* was found sporadic down to a depth of 9 m,

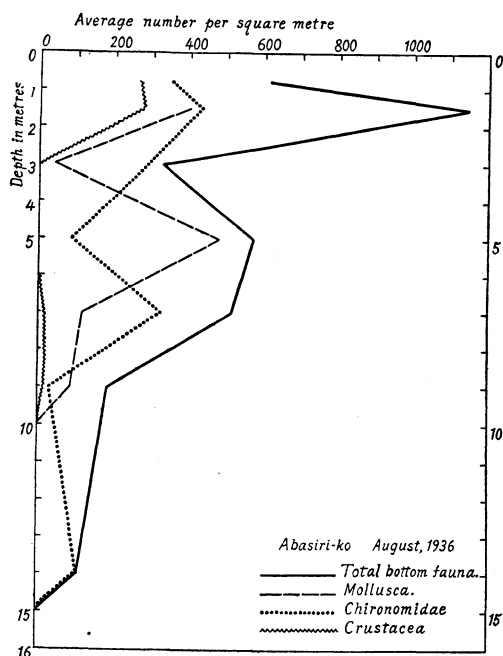


Fig. 2. Depth distribution of the bottom fauna of Abasiri ko.

its number being usually less than 150 per m².

ii) *Depth distribution.* The distribution of the bottom inhabitants with depth is summarized in fig. 2. Among the Chironomidae there are two concentrated zones, the one larger in the littoral and the other smaller in the sublittoral, then decreasing in number with increase of depth. The occurrence of *Chironomus plumosus* at a depth of 14.6 m is unusual. The distribution of the Mollusca is similar to that of the Chironomidae, but its concentrated zones are somewhat shallower than those of the Chironomidae. The Crustacea is quite confined to the shallow littoral region, showing no marked distribution with depth. The depth distribution as a whole also shows two concentrated zones, the one larger in the littoral and the other smaller in the sublittoral. About 87 % of the total bottom population obtained is confined to the littoral region. Such a type of depth distribution was obtained by LUNDBECK (1926) in many eutrophic lakes in North Germany. In those German lakes, however, the second concentrated zone is a little smaller and lying some what deeper than in Abasiri-ko.

iii) *Density.* The abundance of the bottom inhabitants per unit area are summarized in Table II.

TABLE II

Average number of bottom inhabitants per square metre
in Abasiri-ko.¹⁾ 27-29. VIII. 1936.

Depth in metres	Mollusca	Crustacea	Oligo- chaeta	Chirono- midae	Insect larvae other than Chirono- midae	Total number	Total weight ²⁾ g/m ²	Mollusca	Others
0 - 1	0	264	0	352	0	616	2.4	0	2.4
1 - 2	410	275	15	434	11	1145	5.3	2.3	3.0
2 - 4	39	0	0	290	0	329	3.4	0.9	2.5
4 - 6	484	0	0	88	0	572	1.1	1.1	- 3)
6 - 8	117	15	59	325	0	515	2.7	0.9	1.8
8 - 10	88	15	44	29	0	176	2.4	0.7	1.7
10 - 15	0	0	0	110	0	110	0.3	0	0.3
15 - 16	0	0	0	0	0	0	0	0	0
Total:	1138	569	118	1628	11	3463			

Note. — 1) Total number of samples: 40.

2) So called "formalin weight".

3) Too small a quantity as to be weighed.

The population density of the bottom fauna in Abasiri-ko is not very large, the average being 500 per m^2 , the maximum number of 1145 per m^2 being found at a depth of 1-2 m. The greatest average weight was also obtained at the same depth: 5.3 g per m^2 , of which 2.3 g was mollusks. On the deeper bottom the biomass does not correspond to the numerical abundance of the inhabitants. The average number of individuals at a depth of 6-8 m attains 570 per m^2 , while their average weight is only 1.1 g per m^2 due to the minuteness of *Pisidium* inhabiting there.

iv) *The difference of the bottom fauna according to the nature of the bottom.* The differences between the species and the variation of their abundance according to the nature of the bottom is noteworthy ecologically. This data is shown in the Table III.

Of the six classes, nos. 1, 2, 4 and 5 belong to the littoral, comprising about 87 % of the total bottom population. The sandy bottom with aquatic vegetation is abundantly inhabited and accounts for 29% of the total bottom population. The mud bottom covered with weeds is inferior serving as a habitat for only 25.5%. This evidence suggests that aquatic vegetation is one of the important factors determining the nature of the bottom inhabitants. The sublittoral zone of sandy mud is the most void of bottom animals, accounting for only 10 % of the total population. LUNDBECK (1935) reports a similar condition among the bottom fauna of two shallow inland seas in North Germany. In the "Kurischen Haff" the bottom population is the largest where there is a sand bottom with vegetation, the total average number reaching 8721 per m^2 ; that of the dark mud bottom ranks second (6024 per m^2) which is about twice that of the sandy mud (3249 per m^2). The inhabitants of the sand bottom numbered only 1077 per m^2 .

The south bay, Memanbetu-wan, is richer per unit area both in species and individual numbers than the north bay, Yobito-wan (Table IV). The former is regarded as a part of the littoral region of the main basin, the surface exposed to strong wind, while the latter is a narrow bay which is protected from wind. The deep soft mud deposits in the latter bay accumulate a large amount of allochthonous detritus. Owing to such an environmental difference the bottom fauna of the south bay is richer than that of the north. In the Memanbetu-wan the mollusks comprise as much as 66.8% of the total bottom fauna and are rich in the number of species, while in Yobito-wan the Chironomidae larvae are dominant, exceeding even the mollusks. Crustaceans are entirely absent from the latter. This difference is apparently due to the nature of the bottom deposits. The blackish grey mud in Yobito-wan contains a large

TABLE III

Difference of the Bottom Fauna (average number per square metre)
according to the nature of the bottom.

Bottom	1	2	3	4	5	6
	Sand	Sand with vegetation	Sandy mud	Mud with vegetation	Mud	Black mud
Depth in metres	1.2-3.5	0.8-3.0	7-10	1-1.5	1.3-4	14-16
<i>Lymnaea auricularia</i>	—	11	—	97	—	—
<i>Anisus albus spirillus</i>	—	33	—	18	—	—
<i>Valvata</i> spp.	6	11	—	273	6	—
<i>Stenothyra</i> sp.	39	—	—	26	12	—
<i>Viviparus malleatus</i>	—	—	—	9	—	—
<i>Pisidium</i> spp.	22	22	74	77	226	—
<i>Anodonta arcuiformis</i>	—	—	—	(9)	—	—
<i>Anisogommarus kygi</i>	—	22	—	70	—	—
<i>Exosphaeroma oregonensis</i> ...	10	518	—	77	—	—
<i>Neomysis intermedia</i>	6	11	29	53	—	—
<i>Limnodrilus</i> sp.	—	—	—	35	—	—
Orthocladariae	507	396	250	70	176	—
Tanypodinae	11	—	—	53	—	—
<i>Glyptotendipes</i>	—	—	—	18	—	—
<i>Sergentia</i>	—	—	—	9	—	—
<i>Chironomus plumosus</i>	11	—	15	—	57	—
<i>Tanytarsus</i>	—	—	—	—	6	132
<i>Molanna</i>	—	—	—	9	—	—
Brachycentrinae	—	—	—	9	—	—
Total:	622	1024	368	903	483	132
%:	17.6	29.1	10.4	25.5	13.7	3.7

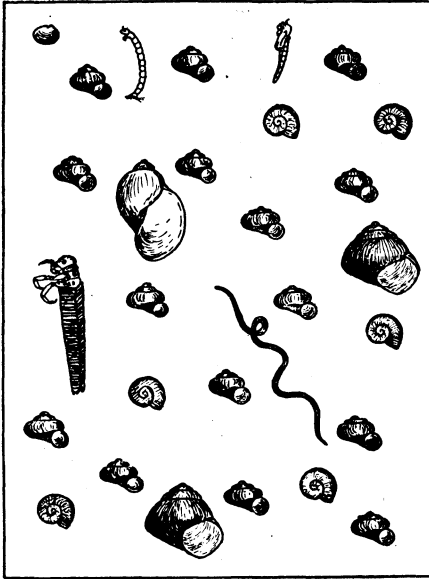
amount of organic substance which is favourable to the Chironomidae larvae, but not to crustaceans which prefer sandy mud. The abundance of aquatic plants in Memanbetu-wan also favours aquatic life especially debris-eating mollusks. The percentage composition of the bottom fauna of Yobito-wan to that of the main basin as a whole is about as follows:

	%
Chironomidae	46.6
Insect larvae other than Chironomidae	0.6
Crustacea	19.0
Mollusca	31.4
Oligochaeta	2.4
	100.0

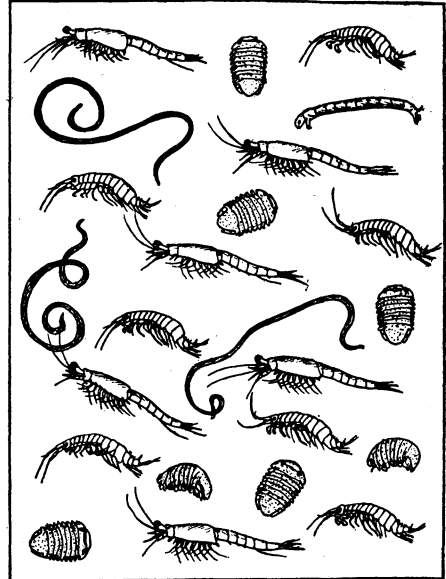
TABLE VI

Difference of the Bottom Fauna (average number per square metre) between the Two Bays.

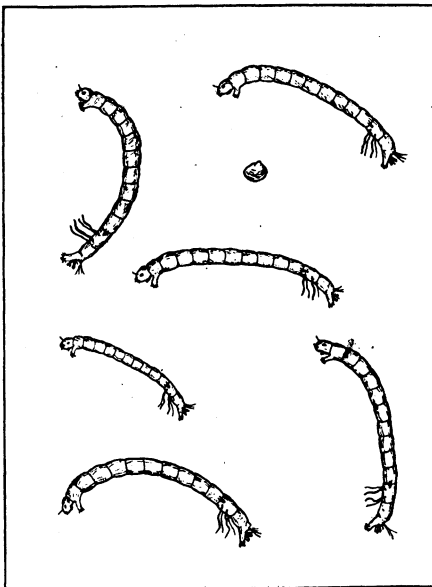
Bottom inhabitant	Memanbetu-wan		Yobito-wan	
	Number	%	Number	%
<i>Lymnaea auricularia</i>	60	8.3	—	—
<i>Anisus albus sprillus</i>	110	15.1	—	—
<i>Valvata</i> spp.	171	23.5	73	12.4
<i>Stenothyra</i> sp.	22	3.1	22	3.8
<i>Viviparus malleatus</i>	6	0.8	—	—
<i>Pisidium</i> spp.	116	15.9	198	33.8
<i>Anisogammarus kygi</i>	44	6.1	—	—
<i>Exosphaeroma oregonensis</i>	50	6.9	—	—
<i>Neomysis intermedia</i>	33	4.5	—	—
<i>Limnodrilus</i> sp.	22	3.1	—	—
Orthocladariae	39	5.4	212	36.2
Tanypodinae	22	3.1	15	2.6
<i>Glyptotendipes</i>	11	1.5	—	—
<i>Sergentia</i>	7	0.9	—	—
<i>Chironomus plumosus</i>	—	—	59	10.0
<i>Tanytarsus</i>	—	—	7	1.2
<i>Molanna</i>	7	0.9	—	—
Brachycentrinae	7	0.9	—	—
Total :	729	100.0	586	100.0



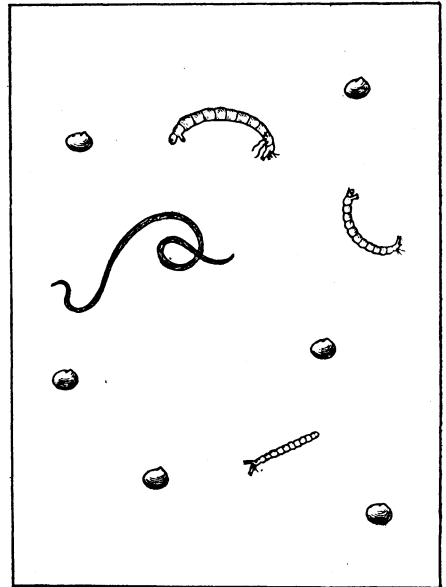
1



2



3



4

Fig. 3.

2. Abasiri-gawa (Abasiri river)

a) General Features of the River

Abasiri-gawa which is the effluent of Abasiri-ko extends some 7 km from its source to the estuary on the Ochotsk Sea. Rising in the north-eastern corner of Abasiri-ko, it flows north about 1 km; turning west it runs for more than 1 km, and then after a remarkable curve it turns again eastward, passing through the town of Abasiri where it empties into the sea. It is not fed by any branch streams. For the most parts, the course of the river is lined by beautiful forest of deciduous trees, but some parts of the middle of the course have been somewhat cleared for field crops or pasture. At the great curve, however, the actual course of the river is bordered by a vast area of *Phragmites*-association. The width of the river is usually less than 100 m and the depth does not exceed 4.5 m at any point during the course. The volume of flow is, according to TAKAYASU's determination on October 1, 1926, 46.35 m³ per minute.

The whole course of the Abasiri river is shown on the sketch map in fig. 4; each station at which observations and collections were made is noted. The cross-section observations made at the seven sections are indicated on the map by the Roman numerals, thus: I-VII. The bottom of the upper course, sections I and II, is of sand and gravel, but the deep central region of section III which is bordered by a swampy area with growths of *Phragmites communis* consists of blackish grey sandy mud. The bottom of the middle and lower course is mostly sand or sandy mud, except the region above the bridge "d" which consists of only gravel and stones. The lower course near the estuary, sections V, VI and VII, contains deposits of black sapropelic soft mud containing

Fig. 3. Schematic representation of the arrangement of animals on four different bottoms of Abasiri-ko. Number per 225 cm².

1. Yellow grey mud bottom at 1 m depth in Memanbetu-wan; presence of *Potamogeton*. Animals are: Tanypodinae, larva 1 and pupa 1; Brachycentrinae, larva 1; *Limnodrilus* 1; *Anisus albus spirillus* 6; *Valvata piscinalis japonica* 15; *Lymnaea* 1; *Viviparus malleatus*, young 2; *Pisidium cinereum nikkoense* 1; total number 29 (1276 per m²), total weight 0.12 g (5.28 g per m²).
2. Sandy mud bottom at 1.5 m depth in the southern part of the main basin; presence of *Potamogeton*. Animals are: *Sergentia*, larva 1; *Limnodrilus* 3; *Anisogammarus kygi* 7; *Exosphaeroma oregonensis* 6; *Neomysis intermedia* 6; total number 23 (1112 per m²), total weight 0.11 g (4.4 g per m²).
3. Blackish brown mud bottom at 2 m depth in Yobito-wan. Animals are: *Chironomus plumosus*, larva 6; *Pisidium pulchellum* 1; total number 7 (308 per m²), total weight 0.19 g (8.36 g per m²).
4. Grey mud bottom at 7 m depth in the main basin. Animals are: Orthocladariidae, larva 1; Tanypodinae, larva 1; *Chironomus plumosus*, larva 1; *Limnodrilus* 1; *Pisidium cinereum nikkoense* 6; total number 10 (440 per m²), total weight 0.06 g (2.64 g per m²).

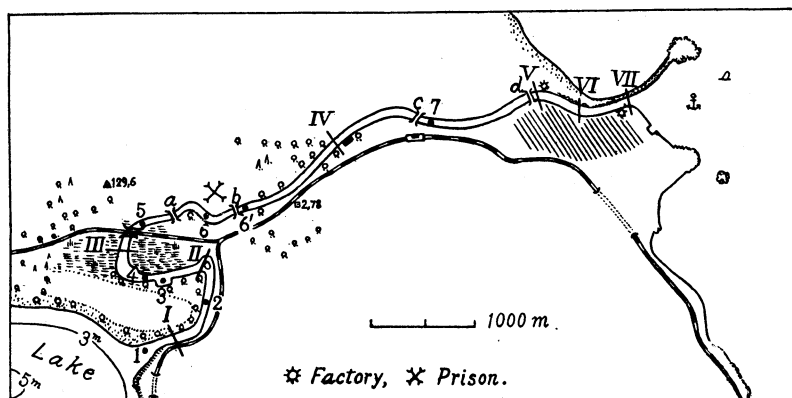


Fig. 4. Sketch map of the Abasiri river.

a large amount of fatty substances. Débris is also most abundant in this part. Such a peculiarity of the bottom in this region is chiefly due to the constant stagnation of the sea water on the deep hollowed bottom below the bridge "d", and to the contamination drained from the fish-markets and canning factories standing on both banks. The river bottom does not support a notable flora of aquatic plants at any point during the course.

b). Physical and Chemical Results

The determinations of water-temperature, dissolved oxygen, hydrogen-ion concentration and chlorine content were done on the field. Transparency was determined by a white disc of 25 cm diameter in the same way as used in the lakes. Besides the observations on the surface water, 7 series of vertical observations were made at different points of each cross-section. The results are shown in Tables V, VI.

All the observations were made at low tide. The water was usually brown, somewhat turbid, the transparency being rather slight. The temperature of the water shows no marked variation through the course, but the surface temperatures are usually a little lower in the centre of the river than near the banks. In the lower course the bottom water is much colder than the surface water, owing to the stagnation of cold sea water. This evidence is also shown by the difference of the pH-values. They fluctuate from 7.0 to 7.2 almost throughout the course not only on the surface but also in the bottom water. In the lower course below bridge "d" the bottom water is remarkable alkaline. This is mainly due to the fact that the sudden increase of depth

TABLE V

Abasiri-gawa; surface water. 28. VIII. 1936.*

Station	Transparency in metres	Temp. °C	pH	Hour	Remarks
I	> 1.6	22.8	7.1	12:00	Small bay at the left side
I {	a	22.6	7.2		
	b	22.3	7.15		
	c	22.4	7.1		
2		22.4	7.0		
II {	a	22.5	7.0		
	b	2.5	7.0		
	c	22.5	7.0		
3	> 1.2	23.8	7.4		
4	> 1.5	22.4	7.0		
III {	a	22.6	7.0		
	b	2.5	7.0		
	c	22.8	7.1		
5	2.5	22.6	7.1	15:00	
6		22.5	7.1		
IV {	a	22.7	7.2	16:00	
	b	2.3	7.2		
7	2.5	22.8	7.0	17:00	
V {	a	2.4	7.1		
	b	22.7	7.1		
	c	22.6	7.0		

* At each cross section, from the left bank to the right the stations were taken as *a*, *b*, *c*, of which *b* is always the centre or deepest point of the river.

below the bridge is a check to the upstream flow of tidal water which retains its high salinity on the deeper layer in this region at ebb. The dissolved oxygen in the deep water of this region is rather diminished. In the upper course the river flow is freshwater, its chlorine content not exceeding 2 g per liter even at the bottom, but in the lower course the chlorine quantity of the bottom water was estimated as being almost similar to that of sea water.

TABLE VI

Abasiri-gawa. Vertical Observations.

Date (1936)	Station	Depth in metres	Temp. °C	pH	O ₂ cc/l	O ₂ %	Chlorine g/l	Observer*
29. VIII.	I	0	22.20	7.1			0.17	Y
		2	21.94	7.2	5.39	87	0.18	
	II	0	22.20	7.2			0.17	Y
		3	22.04	7.2	5.22	85	0.17	
	6'	0	22.30	7.3			0.18	Y
		2	22.12	7.3	5.59	91	0.18	
	IV	0	22.10	7.3	5.60	91	0.18	Y
		1.8	22.15	7.3	5.60	91	0.18	
31. VIII.	V	0	22.10	7.0			0.21	U, Y
		3.5	21.70	8.2	2.97	48	0.32	
	VI	0	22.10	7.1				U, Y
		4	19.80	8.2				
	VII	0	22.10	7.2	5.37	87	0.73	U, Y
		4.3	16.80	8.2	4.00	58	17.93	

* U=UENO; Y=YOSHIMURA.

c) Bottom Fauna

i) *Composition and distribution of the bottom fauna.* Some 15 species of animals inhabiting the bottom were found in the river. The important components widely distributed through the course are larvae and pupae of the Chironomidae, an isopod crustacean *Exosphaeroma oregonensis* DANA, an amphipodan *Grandidierella japonica* STEPHENSEN (1938) and a polychaete annelid *Nereis japonica* IZUKA. The distribution of these forms is shown in the accompanying figure.

The Chironomidae larvae, mostly Orthocladiariae and *Sergentia* and at least two more species in very small numbers, increase from cross-section II, reaching the largest population at section III, and then decrease and disappear at section V. Section III is most favourable for these larvae because the bottom of that part consists of abundant mud. The rapid decrease below section IV is caused by the marked change of bottom materials from sandy mud to gravel and by

the stenohaline nature of these larvae. The density of the Chironomidae fluctuates from 300 to 500 per m^2 in section II-IV, and the largest population of 968 individuals per m^2 was found in IIIb (Table V).

Exosphaeroma oregonensis is the most important component of the bottom fauna of the river under consideration. It appears to prefer a sandy bottom,

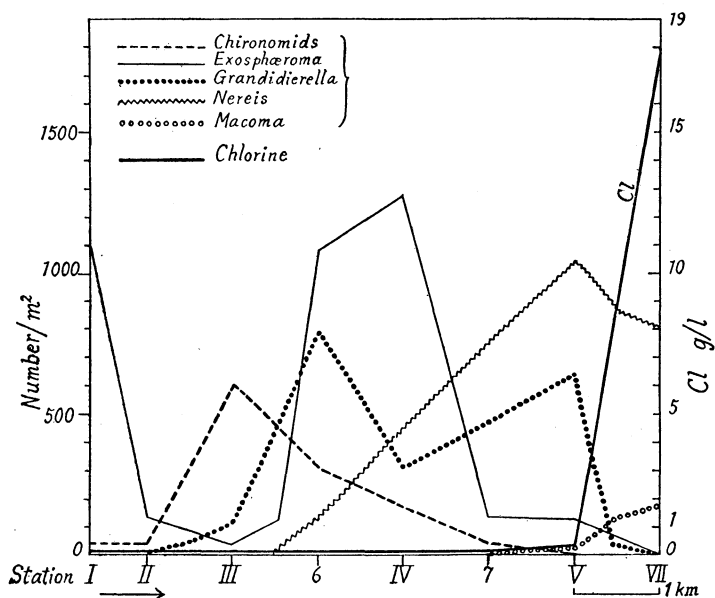


Fig. 5. Distribution of the bottom fauna in the Abasiri river.

in contrast with the Chironomidae larvae. Its distribution, as shown in fig. 5, amply demonstrates this relationship. In the sandy bottom of the source of the river as many as 1276 per m^2 were found, but in the muddy bottom of section III only a very few individuals live in the marginal parts which are richer in sand. However, in several other stations with sandy bottoms it again increases remarkably, attaining more than 1200 per m^2 . Such a difference was also observed in a cross-section, as can be seen from the following examples (Table VII).

Exosphaeroma oregonensis is an euryhaline species which usually inhabits brackish water lakes and rivers but has good adaptability to freshwater. In Abasiri-gawa as well as in Abasiri-ko, as stated already, it abounds in quite freshwater and in the former it entirely disappears at the estuary.

TABLE VII
Abasiri-gawa.

Section	Station	Depth in metres	Sand	Animals number/m. ²
III	left	1.8	+	0
	center	3.8	+	0
	right	0.8	+	44
IV	left	1.4	++	1276
	center	3.2	+	0
V	left	3.8	+	220
	center	4.2		0
	right	3.0		44

The brackish water amphipod *Grandidierella japonica* also survives from the middle to the lower course, attaining as many as 100 per m², at one time 2552 being found at section IV. This species does not occur in Abasiri-ko, while it is found rather abundantly in Mokoto-numa, as will be shown in the next chapter.

The polychaete annelid *Nereis japonica* is an animal most abundant in the lower course especially below the bridge "d" (sect. V), inhabiting not only the sandy bottom but also the sapropelic black mud. The upper limit of its range appears to be station 6 in the neighbourhood of the Abasiri prison, where it was found dwelling in the shallow sandy bottom near the bank. The individual number per m² in the main area of occurrence attains 1850.

Mollusks are of only two species, *Macoma baltica* and *Paphia variegata*. These are found only in the lower course near the estuary and appear to increase in numbers toward the sea (44-176 per m²). This is to be expected as those mollusks are marine animals.

Mokoto-numa (Lake Mokoto)

a) General Features of the Lake

Close to the coast of the Ochotsk Sea in the neighbourhood of the town of Abasiri, there are four shallow lakes of various sizes, of which Mokoto-numa is ecologically the most striking. It is a small lake with a maximum length of only 2 km and a maximum depth of 5.8 m. Its longer axis extends in a NE-SW direction and the widest part is in the northern half. The north-

eastern and south-western margins are bordered by low terraces, while the northern and southern parts are large swampy areas. The influent Mokoto-gawa is a rather long river that runs down from Mt. Mokoto, some 35 km south of the lake, and flows into the lake at its southern part where it forms a rather large delta. The lake discharges at the north-eastern end; the effluent meanders about 1 km through low dunes and empties into the Ochotsk Sea. The basin of this lake is probably a drowned valley, and the lake was possibly created when the Mokoto-gawa was dammed by a sand dune at its estuary.

Bottom deposits. Bottoms shallower than 1 m consist of sand; sandy mud at 1-2 m, blackish brown mud at 2-4 m. Bottoms deeper than 4 m are entirely covered with black cream-like soft mud which gave off a very strong odor of hydrogen sulphide. The temperature of this mud was 13.8°C in the upper 1 cm zone and 13°C in the zone 3 cm below the surface of the mud, when the water just above the surface of mud was 14°C . This black mud is quite similar to that found in the deep bottom of Abasiri-ko previously described.

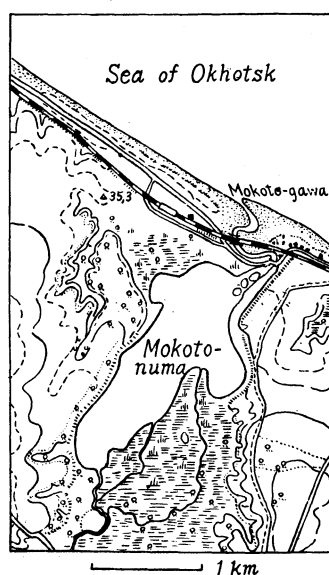


Fig. 6. Mokoto-numa.

b) Physical and Chemical Results

The water was dark greenish brown and markedly turbid, a SECCHI's white disc being invisible at a depth of only 0.7 m. The water temperature and several chemical results obtained by Dr. YOSHIMURA collateral to the writer's work are shown in Table VIII.

As could be known from the chlorine content of the water, the surface layer is quite fresh, while the water deeper than 2 m is remarkably saline due to the underlying of heavy sea water. Such a marked stratification of the density of the water produces great effects upon the stratification of the water-temperature and other chemical components. Of these, the absence of dissolved oxygen and the occurrence of hydrogen sulphide in deep water are the most important because of their effect upon the distribution of the bottom inhabitants.

TABLE VIII.

Mokoto-numa. 30. VIII. 1936.

Depth in metres	Temp. °C	pH	O ₂ cc/l	O ₂ %	H ₂ S mg/l	Chlorine g/l	Remarks
0	17.70	7.0	5.70	85	0	0.17	lake proper
0.5	15.57	7.6	—	—	—	—	
1	20.92	8.0	6.68	106	—	—	
1.5	21.01	8.0	6.21	99	—	9.9	
2	19.98	7.9	5.00	78	0	—	
3	18.12	7.7	0.49	7	0	15.5	
4	16.12	7.6	0	0	0.5	16.1	
5	14.17	7.6	0	0	12.2	16.6	
5.3	14.00					16.8	
0	19.8	7.6	6.41	99		1.0	effluent, under the bridge
1.2	19.71	7.6	5.90	91		1.05	
0	19.8	7.6					effluent, middle course

Transparency: 0.7 m (in the lake).

c) Bottom Fauna

The bottom fauna of Mokoto-numa and its effluent Mokoto-gawa consists of four groups of animals, of which the polychaete annelids and a bivalve *Corbicula* are the most important components of the fauna, as will be seen from the following table.

	%
<i>Corbicula sadoensis</i>	29.7
<i>Macoma</i> 3 spp.	14.8
<i>Theora lubrica</i>	0.6
<i>Paphia variegata</i>	1.5
<i>Grandidierella japonica</i>	9.0
<i>Anisogammarus kygi</i>	0.6
Polychaete Annelida	43.2
Chironomidae (larvae and pupae)	0.6
	100.0

1. *Chironomidae*. A few (44-88 per m²) of the larvae and pupae of the Orthocladiariae and of *Sergentia* were found at a depth of 0.6 m which is about

the lower boundary of the freshwater.

2. *Crustacea*. Of the three species found, *Exosphaeroma oregonensis* was collected only in the effluent, reaching 264 per m². *Anisogammarus* (*Eogammarus*) *kygi* was more abundant in the effluent than in the lake, being enumerated at more than 880 per m². The other crustacean *Grandidierella japonica* STEPHENSEN (1938), which is the same species as was found in the Abasiri river, was collected in both the lake and the effluent, but was confined chiefly to the bottoms shallower than 1 m, reaching 484 per m².

3. *Mollusca*. The following seven species of bivalves (det. by KURODA) were found in the lake and its effluent:

1. *Corbicula sadoensis* PILSBRY
2. *Paphia variegata* SOWERBY
3. *Sanguinolaria* (*Nuttalia*) *nuttali* CONRAD
4. *Macoma nasuta* CONRAD
5. *M. incongrua* VON MARTENS
6. *M. baltica* LINNÉ
7. *Theora lubrica* GOULD

Of these, the first-named is the dominant species, being very abundant in the shallow sandy bottom of the freshwater area especially in the northern half of the lake. In numbers it averages about 500 per m² and often numbers as many as 1000. In the effluent, however, it does not exceed 250 per m². *Macoma baltica* ranks second to the above species; it is most abundant in the 2 m bottom, where it attains to 830 per m². The three species of *Macoma* as well as *Theora lubrica*, all of which are of course marine mollusks, appear to be confined to the 2 m bottom where the chlorine content of the water is 15 g per litre. *Sanguinolaria* did not occur in the lake proper, but in the effluent it was found in the bottom sand under water 0.5-1 m deep; its number per m² did not exceed 132.

4. *Polychaete Annelida*. Two species were found:

- Nereis japonica* IZUKA
Prionospio japonicus OKUDA

These polychaetes were most abundant in sandy bottoms shallower than 2 m, particularly 1 m, where there were as many as 748 per m². In the effluent there were found 600 per m². It is of interest that these two polychaetes, of which *Nereis japonica* is dominant, are confined to the region of less salinity, as in the case of the Abasiri river. *Prionospio japonicus* was collected for the first time in this lake (OKUDA 1937).

The density of population is greatest on the freshwater area bottoms shallower than 1 m; it suddenly decreases below that depth, the number of

TABLE IX

Average number of bottom inhabitants per square metre
in Mokoto-numa¹⁾. 11. VIII. 1936.

Depth in metres	Mollusca	Crustacea	Chironomidae	Polychaeta	Total
0-1	735	220	15	600	1570
1-3	968	0	0	132	550
3-4	0	0	0	59	59
4-6	0	0	0	0	0
Total :	1703	220	15	791	2179

Note.— 1) Total number of samples : 18.

animals per unit area in 2-4 m being as small as 1/30 of that at 0-1 m. The bottom of black mud deeper than 4 m, such as that of Abasiri-ko, is entirely azoic due to the presence of a large amount of hydrogen sulphide.

The bottom consisting of sand or sandy mud supports most of the inhabitants, among which *Nereis japonica* is the largest in number (Table X). A marine bivalve, *Macoma baltica*, on the contrary, is found most abundantly in mud bottoms that are below sandy bottoms.

TABLE X

Mokoto-numa. 11. VIII. 1936.
Average Number per square metre.

Bottom	Depth in metres	Number of samples	<i>Sergentia</i>	<i>Aniso- gammurus</i>	<i>Grandidie- rella japonica</i>	<i>Macoma baltica</i>	<i>Nereis japonica</i>
Sand Sandy mud }	0-1.5	4	11	11	154	22	600
Mud	1.5-3.5	3	0	0	0	278	220
Black mud	4-5.6	6	0	0	0	0	0

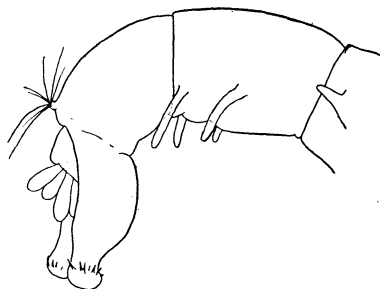
Discussion

a) Nature of Bottoms and the Salinity of Water

The nature of the bottom plays an important rôle in the distribution and the abundance of the bottom fauna. This is seen in Abasiri-ko and Mokotonuma, and more clearly in Abasiri-gawa (Tables III and X; fig. 5). Ecologically the most noticeable bottom deposit of the lakes studied is that of black mud. This is similar in character to those of certain coastal lakes with shallow thresholds, in which the dissolved oxygen of deep water always disappears in summer. In Japan such a black mud is found not only in coastal lakes but also in either certain lakes such as Nikko volcanic ranges (MIYADI 1931) or rarely in an extremely eutrophic lake (UÉNO 1936). Recently MÜNSTER STRÖM (1936) studied similar black mud deposits in 30 land-locked fjords in the Norwegian coast between Oslo and Sogne-fjord, and discussed their genesis under anörobic conditions and their change during late quarternary times. It appears from previous investigations that the black mud deposits are found as a rule at the bottoms of more or less enclosed seas, of bays, fjords or coastal lakes with weak tidal action. Analyzing the ecological factors of the Palearctic black shales of New York, RUEDEMANN (1935) formulated some ecological criteria concerning black mud formation. He pointed out that "the controlling factor is the relative lack of oxygen and the accumulation of organic matter faster than it can be oxidized". The black mud in the two lakes considered in the present paper as well as in certain other coastal lakes in Japan also formed under conditions such as were suggested by RUEDEMANN.

The toxic quality of the bottom water, owing to the lack of dissolved oxygen and the presence of hydrogen sulphide that was formed from the reduction of sulphates contained in the underlying sea water, makes it impossible for animals to inhabit the black mud deposits.

In this connection it is of great interest that on one occasion in Abasiri-ko three larvae of *Chironomus plumosus* were taken up from a depth of 14.6 m, where the the bottom deposit was a typical black mud which gave off an odor of H_2S and the water just above the bottom contained 8 g per litre of chlorine. These larvae were very large in size, more than 2 cm long, remarkably blood-red when they were alive, and were unusual in having on the last abdominal



Fi H abdominal segments of a larva of *Chironomus plumosus* with short "tubuli", taken up from the deep bottom of Abasiri-ko.

segment very short "tubuli" which extend downward a little beyond the abdomen. The correlation between the length of the "tubuli" or so-called blood-gills of the *Chironomus*-larvae and the salinity of their habitats has been discussed by several workers (cf. LENZ 1937). LENZ (1931) found many *Chironomus*-larvae without "tubuli" in the stomach-content of a flamingo which had been caught in a brackish water lake, Bahira, in Tunis of Africa. PAGAST (1936) has shown that under experimental conditions the anal gills of the larvae of a mosquito *Aedes aegypti* became shorter in length when they were kept in water rich in NaCl, and became longer in acid water. Recently LENZ (1937) has reported that chironomid larvae of the *pumusus*-type (*Ch. palpalis* JOHANSEN) collected in sulphuretted mineral springs and other acid waters in Java have remarkably long "tubuli". It is of interest in contrast with the above statement that in the marine larvae of certain chironomids (genera *Pontomyia*, *Clunio*, *Paraclunio*, *Camptocladius*, *Tanytarsus* and so on) the "tubuli" or so-called "blood-gills" are entirely absent (cf. TOKUNAGA 1932, p. 52). To corroborate the fact that the "tubuli" or anal gills of chironomids are shortened in water rich in salts, a detailed experimental study under laboratory conditions as well as a comparative study in natural habitats would be required.¹⁾

As already stated, the polychaete annelid *Nereis japonica* survives in Mokotonuma and in Abasiri-gawa. In the latter it dwells in the sandy mud bottom some 5 km distant from the estuary, but it has not been found in Abasiri-ko. In the Abasiri river just above its uppermost habitat the water is quite fresh, while its lowermost habitat has a salinity similar to that of the sea. This polychaete can survive to some extent the most extreme fluctuations in salinity, as has been demonstrated in connection with certain other species of *Nereis*. In an experimental study, NOMURA (1930) has found that *Nereis japonica* taken from the shallow sea bottom at Asamusi is better adapted to polyhaline than to oligohaline or mesohaline waters, and that it maintains its activity in normal sea water better than in a diluted sea water which contains 13.55 g per litre of chlorine (about 70 % of sea water) and shows the pH-value 8.2. In the present case, however, it was found even in water of pH 7.3 and of chlorine content only 0.18 g per litre. Burrowing forms such as *Nereis japonica* could probably well survive in low salinity owing to the fact that the interstitial water of the bottom sand retains its high salinity at ebb, as has been suggested by certain investigators (cf. ALEXANDER et al. 1932).

1) Recently KOCH (1938) has concluded in an experimental study that in *Chironomus* and *Culex* "the difference in size of the anal papillae of larvae from different biotopes or reared in different salt solutions is a functional adaptation to salt absorption from these media".

b) Biological Types of the Lakes and the River Studied.

1. *Lakes.* Abasiri-ko and Mokoto-numa are regarded as eutrophic. In the former the oxygen curve in summer is of the typical form designated as eutrophic; a rather pronounced water-bloom consisting chiefly of *Aphanizomenon flos-aquae* (cf. NEGORO 1937) appears in mid-summer; the bottom fauna, besides

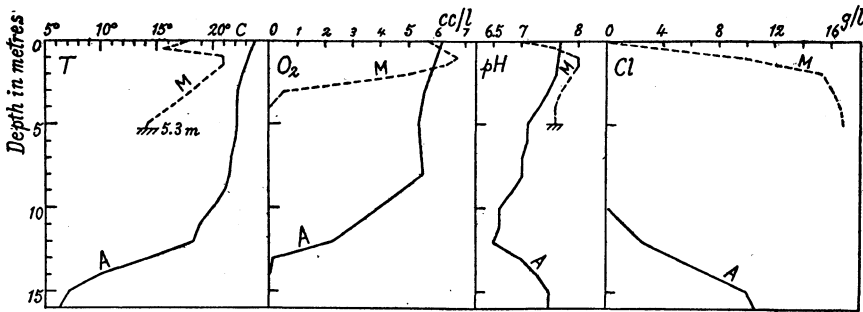


Fig. 8. Temperature and chemical stratifications in Abasiri-ko (A) and Mokoto-numa (M).

the abundance of mollusks usually characteristic of the coastal lakes of Hokkaido, is characterized by the occurrence of *Chironomus plumosus*, though smaller in numbers than in the case of other chironomids such as Orthocladariae. So far as the bottom fauna is concerned, Abasiri-ko is the Mollusca-*plumosus* type designated by MIYADI (1933), though in less advanced eutrophic condition than several lakes in Hokkaido such as Tōro-ko which is a typical polytrophic *plumosus* lake (MIYADI 1932; UENO, a forthcoming paper).

Mokoto-numa is, on the contrary, apparently of the Mollusca type, but is characterized by the presence of polychaete annelids which consist chiefly of *Nereis japonica* comprising nearly 50 % of the total bottom fauna. Such a type, i.e. the Mollusca-*Nereis* type, may be one of the characteristic types of coastal lakes with a remarkable tidal action, though no suitable classification of such kinds of lakes has been established. Mokoto-numa has essentially brackish water though its upper layers are quite fresh.

2. *Classification of rivers.* NAUMANN (1932) tried to apply his classification of lakes based on biological production to various kinds of inland waters including rivers. There are, however, certain difficulties in dividing rivers into eutrophic and oligotrophic or so on, owing to the much more incessant change of milieu factors in rivers than in closed bodies of water such as lakes. SHELFORD and EDDY (1929) suggested that it is helpful to use dominant species of fishes or aquatic insect larvae for the classification of stream communities, but

such a method is not always applicable to various kinds of flowing waters especially from the regional point of view. THIENEMANN (1912) divided the course of a mountain stream of Sauerland on the basis of the dominant species of fishes inhabiting it, i. e. the springs and spring-fed brooks, the trout-beck, and the region where the cyprinid fishes were dominant. It is difficult to classify regionally different streams by this method because fish not only differ among streams but also change seasonally up and down the course of the same stream. Accordingly, NAUMANN's suggestion (l.c.) that the classification be based on various milieu factors as well as on biological production appears to be the most rational, if it were possible technically to carry out easily.

In a study written in Japanese on the lakes and streams of the Nikko mountain range, UÉNO (1934) suggested a method applicable to the classification of flowing waters. According to this method, the physiographical and physical factors, such as types of bottom, speed of current, volume of flow, temperature of water, light intensity, and also the chemical properties of the water, especially its hardness and the quantity of nutritive substances such as nitrogenous compounds, phosphorus and silicates should be determined. Parallel to the seasonal study of these factors, the periodicity and abundance of aquatic vegetation, particularly the minute algae on the river beds, should be examined; then the relation of these algae and aquatic insect larvae as food for fishes should be studied.

Based upon such a comprehensive ecological examination, i.e. the causal analytical standpoint of biological production, the streams under consideration could be classified most rationally. There is, however, still another important matter to be noted. A stream that receive either strongly acid water from a mineral spring (cf. UÉNO 1933) or remarkably polluted water due to the decomposition of organic matters, may greatly restrict production or it may be entirely impossible for organisms to exist in it. According to the presence or absence of such factors, the streams may be divided into two major types, *harmonic* and *inharmonic*, as has been suggested by THIENEMANN (1931) on the classification of lakes. Under these two major groups the designation of certain types according to trophic degrees should be possible, but in regard to the harmonic group the standardization of each type, oligotrophic or eutrophic and certain others, is still somewhat difficult. It is also to be noted that certain toxic salts often play an important rôle in the production of certain organisms. HARVEY (1933) has pointed out that a salt is a "growth-promoting factor"; iron salts are usually toxic upon organisms even in minute quantities, but they often have promoting effects upon the growth of certain diatoms.

In this connection, RICKER's classification of certain Canadian streams is

most ecological and seems to be not far from our ideal scheme. RICKER (1934) has classified certain Ontario streams on the basis of the following factors: the "chemical composition of the basic rocks and of the region through which the river flows; type of soil and vegetation of the watershed; speed of current; type of bottom; width and depth (which with speed of current determine volume of flow); temperature of the water; oxygen and carbon dioxide content of the water; flora and fauna". He pointed out that "the distinctions between swift-stony and slow-muddy types are, perhaps, the most fundamental from the point of view of the biota, ... " (l.c. p. 16).

Certain streams in Hokkaido previously visited by the writer resemble in some respects those of the Ontario types shown by RICKER. In the Abasiri river described in the foregoing pages, there are also some points which resemble RICKER's types, especially his "B 1 a", that is, the slow trout streams:—volume greater than 0.28 m^3 per sec. on June 1; mud over most of bottom; maximum summer temperature not excess of 24°C ; principal piscivorous fish, *Salvelinus fontinalis*. The Abasiri river differs, however, from RICKER's in that it is much wider and empties into the sea. Three species of fishes are common in the Abasiri river, namely, *Tribolodon hakuensis ezoë* OKADA et IKEDA, *Platichthys stellatus* (PALLAS) and *Oncorhynchus masou* (BREYVOORT). The first-named white-mullet is well-adapted to both fresh and saline waters; the second-named flat-fish is regarded as a freshwater tolerant. The last, the common Pacific salmon, was found to be an anadromous fish. Such types of rivers are not found south of Hokkaido.

Summary

1. The bottom faunae of two lakes and one river on the coast of Hokkaido facing Ochotsk sea were studied in the late summer of 1936. Both lakes, Abasiri-ko and Mokoto-numa, are remarkable in having black mud deposits which make it impossible for organisms to inhabit them.

2. The important components of the bottom fauna of the lakes mentioned are chironomid larvae, mollusks and crustaceans. The relatively large proportion of the latter two groups, especially of the mollusks, to the total bottom population is a special characteristic of the lakes. Such a composition of the bottom fauna is usually met with in the lakes north of Hokkaido and not in those south of it.

3. Owing to the bottom features and to the underlying water of high salinity, the bottom inhabitants of both lakes are concentrated in the shallow littoral zones especially in the areas of sandy or muddy sand bottom.

4. The distribution of the bottom fauna in the Abasiri river from its source to the estuary is largely controlled by the bottom features and the difference of salinity in the different parts of the course. The fauna consists largely of brackish water crustaceans in the greater parts of the course and of the marine species in the lower course.

5. Both lakes mentioned are regarded as eutrophic. As far as the bottom fauna is concerned, Abasiri-ko is the *Mollusca-plumosus* type and Mokoto-numa is the *Mollusca-Nereis* type which is for the first time designated.

6. A critical discussion is made of the ecological classification of streams. It seems possible to classify rivers, when it is done from the causal analytical standpoint of biological production.

摘 要

北海道網走湖及びその近隣陸水の底棲動物

北見國網走湖及びその排出河網走川、並に藻琴沼の昭和10年晩夏に於ける底棲動物を記述した。これら兩湖の底棲動物は貝類及び甲殻類特に前者が卓越し、何れも浅い湖底に夥しい。網走川に於ては底質と底水の鹹度の相違により、底棲動物の顯著なる分布が見られた。網走湖は底棲動物による *Mollusca-plumosus* 型、藻琴沼は *Mollusca-Nereis* 型である。

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Amphibians and Reptiles Collected in Inner Mongolia

By

Tetsuo INUKAI

(犬飼哲夫)

We are particularly grateful that we could lead the expedition into Wanfu and Kholonboir in Inner Mongolia and into Khalassu on the eastern side of Great Khinghan Mountains in the summer of 1937 under the auspices of the Kanegafuchi-boseki Kaisha and devote much attention to the collection of amphibians and reptiles. Wanfu, situated in the northeastern part of Inner Mongolia and having a particular alkali soil, is probably one of the most interesting while least surveyed areas in Manchukuo. There a vast area was settled along the southern banks of the River Sungari for a grazing field for sheep and cattle in which the expedition worked. The greater part of the pasture is a little elevated and arid, covered with rather poor weeds of at most $\frac{1}{2}$ meter height, while on the lower swampy section a rich vegetation is found around a chain of puddles of varying size most of which appear after a rain for a considerable length of time on account of difficult permeation of water through the alkali soil. Kholonboir is a place of special interest with its steppe, a vast arid plain destitute of trees and clothed with scanty low grass.

The district east of Great Khinghan Mountains is popular because of its mild climate, a rich vegetation and clear waters looking like an oasis in the gray Manchurian boundless plain. The herpetological fauna in these regions has not with certainty been completely known.

Reptilia

Sauria

Eremias argus PETERS

3 adult specimens were collected on September 6 on the sand hill in the transitional region between the steppe and the Mongolian desert 80 km southwest from Khailar of Kholonboir. The same species has been described by OKADA (1935) from Jehol. The habitat of the lizard has been hitherto known as northeastern China and Chosen (STEJNEGER, 1907, 1925) Mongolia, western and southern Manchukuo (MORI, 1927; SOWERBY, 1930).

*Serpent****Elaphe dione* PALLAS**

1 adult male which is 73 cm in body length and 1 young male with 20 cm body length.

Both were captured on August 30 in the grazing field of Wanfu. The adult is marked with 4 rows of dark longitudinal bands on the dorsal which is tawny-olive in colour. The dusky crossbars on the dorsal as described by STEJNEGER (1907), SOWERBY (1923), MAKI (1927) and OKADA (1935) as one of the characteristics of the species is only valid in younger specimens. In the living adult the crossbars are almost invisible but they appear distinctly in the preservation. In the Harbin Museum there is a young specimen collected around the vicinity having the clear crossbars. This snake is distributed widely from Volga in southeastern Russia to the Amur country in the north and south to the island of Hainan.

***Amyda* sp.**

The soft-shell turtle inhabits the Sungari drainage in great numbers and is caught for marketing as a delicacy. We obtained 3 examples from the natives in Wanfu. Though STEJNEGER reported in 1907 the Manchurian soft-shell turtle as *Amyda maackii* (BRANDT), at present I have not enough materials for the taxonomical study.

*Amphibia**Bufo*
*Bufonidae****Bufo bufo asiaticus* STEINDACHNER**

Many adults and a young.

A young toad was collected on September 9 around a stream (pH 8.1) in the steppe of Kholonboir about 70 km north of Khailar. The adults were captured on September 11 by the dredge for fishes set in the pools in Khalassu in Khinghan Mountains. Some were speared in the river at night being searched for by light when they were crouching on the bottom among the water grass, a kind of *Ranunculus* sp., perhaps ready for hibernation. By the way, the water in which *Ranunculus* sp. grows indicates unfrozen water in winter. The toad is found commonly in eastern Mongolia, Manchuria, Amurland, Chosen and Northeastern China from Peking to Shanghai.

***Bufo raddei* STRAUCH**

Many adults.

During our sojourn in Wanfu from August 29 to September 1 we could obtain many specimens of the toad of varying size. Here in the day time when the air temperature was high, for example on August 30, 24.6°C at 10.20 a.m. and 23.6°C at 2.20 p.m., and in a sunny place higher, no toad was found in the field. However at sunset hundreds of them appeared on the open track in search of prey. It is truly surprising that they occur in so a large number in such an arid land. According to Koba (1937) the toad lives under some shelters making a tunnel in the ground. Dr. UWATOKO, who has explored Kholonboir, kindly handed me a specimen which is completely covered with salts, obtained from the salty lake in the steppe near Dalai Nor.

STEJNEGER (1925) remarked that this toad inhabits rather dry regions, ranging from Central Asia to Amurland, including the eastern part of the desert Gobi, Alashen and Ordos in Mongolia, Peking and Chefu in the south and north to Dauria, the valley of the Amur and the Ussuri country. According to SHAW (1929) this toad seems to be rather rare in the vicinity of Peking.

Ranidae

Rana nigromaculata nigromaculata HALLOWELL

3 adult males were collected on August 30 in a pool which was 65 cm in depth and about 10 meters in diameter in the lowland of Wanfu. The water temperature was at that time 29.5°C at 3.30 p.m. and the pH value was 7.8. It is thus note worthy that the frog can inhabit an alkali soil region in Inner Mongolia. Usually the frog is widely distributed in eastern Asia from Vladivostok in the north to Bangkok, Siam in the south. Amur, Ussuri district, Great Khinghan Mountains, Jehol, Chosen, North China, Shanghai, Hongkong, Japan proper, Kyushu and Shikoku are known as the habitat of the animal.

Rana amurensis BOULENGER

This is a common frog in the swampy district in the Kholonboir steppe north to Khailar and around the stream of Khalassu. The frog was originally described from Amurland and reported to occur in Saghalien, the Coast Province, southern Manchuria, Northern China and northeastern Tibet.

Rana asiatica (BEDRIAGA)

The frog occurs around the stream north to Khailar. Siberia, Mongolia, the northern portion of Ki-lin and Jehol are the hitherto known habitat of the species.

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Rotatorian Fauna of Manchoukuo

By

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With 10 text-figures

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Introduction

Regarding the Rotatorian fauna of Manchoukuo, 22 species have been described by M. UENO (1936), M. YAMASAKI (1937, 1938), the present writer (1937), and himself jointly with T. INUKAI (1938). In addition to them 31 forms are reported in this paper. Thence 53 species in all belong to 16 families as described in the following.

The materials upon which the present investigation is based, were obtained by the writer from the reservoir and a pond at Hsinking, two weedy pools at Khailassu situated on the eastern slope of the Great Khingan Mountains, a weedy pond and two pools at Hailar, and many small basins distributed in the drainage area of the Gan, one of the upper tributaries of the Amur, during the scientific expedition to Manchoukuo, despatched by the Kanebo Company under the directions of Dr. Y. SATO and Dr. T. INUKAI in August–September, 1937. The others were taken by Mr. T. ISIWATA in June–July, 1937 from

several shallow dammed lakes in the volcanic region of Wutalienchih located at the southern foot of the Little Khingan Mountains.

All of the materials were taken with a plankton-net from small bodies of water at these localities. Water temperature at the time of collection was rather high excepting in the district of the Great Khingan Mountains comprising the regions of Khailassu and the Gan. Waters of the most localities were basic except those of Khailassu.

The writer's cordial thanks are due to the Kanebo Company and also to Dr. Y. SATO and Dr. T. INUKAI, professors of the Hokkaido Imperial University, for their great assistance, and also thanks must be extended to Mr. T. ISIWATA of the Institute of Scientific Research, Manchoukuo for his kindness in placing his plankton materials at the writer's disposal.

Systematic Part

Order PLOIMA

Family NOTOMMATIDAE

1. *Notommata aurita* (MÜLLER)

Jap. Name :—*Kogatawamusi*.

Hab.:—A weedy pool at Hailar, very rare.

2. *Monommata orbis* (MÜLLER)

Jap. Name :—*Asinagawamusi*.

Hab.: A drain in the region of the Gan, very rare.

Family BRACHIONIDAE

3. *Brachionus capsuliflorus* PALLAS (= *B. bakeri* MÜLLER)

Jap. Name :—*Kado-tubowamusi*.

Hab.:—Shallow lakes in the region of Wutalienchih, very rare; a weedy pool at Hailar, rare.

A reservoir in Kwantung Province (YAMASAKI, 1937); the Sungari at Harbin and Tsitsihar (UÉNO, 1936).

This species contains several varieties and intermediate forms between them, but the writer examined only two forms; the typical one occurring in the plankton of a dammed lake in Wutalienchih and a weedy pool at Hailar, and var. *brevispinus* EHRENBERG in the collection of another lake of the former locality in which blue-green algae were very abundant when collection was made. UÉNO reported the following three varieties besides the typical form from the

summer plankton of the Sungari; var. *brevispinus*, *rhenanus* (LAUTERBORN), and *rhenanus-entzii* (FRANCÉ).

4. ***Brachionus calyciflorus* PALLAS** Fig. 1
(=*B. pala* EHRENBERG)

Jap. Name :—*Tubowamusi*.

Hab.:—The reservoir and a pond at Hsinking rare; an eutrophic lake in the region of Wutalienchih rare.

The Sungari at Harbin and Tsitsihar (UÉNO, 1936).

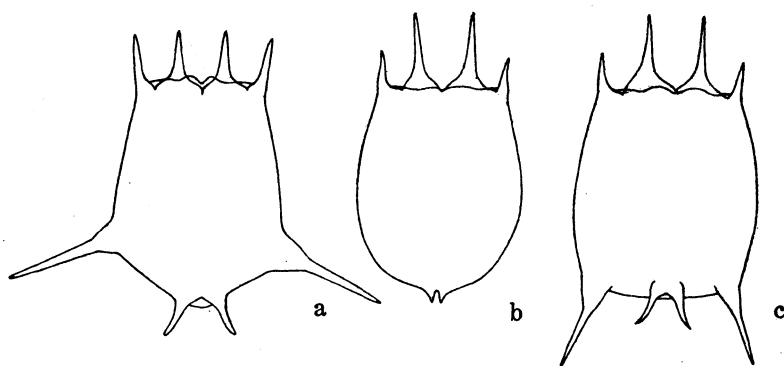


Fig. 1. *Brachionus calyciflorus* PALLAS $\times 120$
a. f. *amphiceros* EHRENBERG from the region of Wutalienchih
b. var. *dorcas* GOSSE from Hsinking
c. var. *dorcas* f. *spinosus* WIERZEJSKI from Hsinking

Specimens obtained from the region of Wutalienchih and those collected by UÉNO from the Sungari, were all assignable to f. *amphiceros* EHRENBERG with elongate lateral spines, especially the former carried more laterally extending spines as shown in fig. 1 a. Individuals from Hsinking belonged to var. *dorcas* GOSSE differing from the typical form of this species in having two inner anterior spines longer than other lateral ones. In the plankton of the reservoir of the city f. *spinosus* WIERZEJSKI of this variety allied to f. *amphiceros* in bearing lateral spines, was also detected with this variety.

5. ***Brachionus urceus* LINNÉ**
(=*B. urceolaris* LINNÉ)

Jap. Name :—*Maru-tubowamusi**.

Hab.:—A dammed lake the region of in Wutalienchih, rare.

Shallow pools in the plain near Nungan (INUKAI & HADA, 1938);

* New Japanese name.

the Sungari at Tsitsihar (UÉNO, 1936); a small pool in the Mongolian steppe to the south of Hailar (HADA, 1937).

6. *Brachionus plicatilis* MÜLLER
(=*B. mülleri* EHRENBERG)

Jap. Name :—*Sizwo-tubowamusi**.

Hab.:—A shallow salt lake in the Mongolian steppe to the south-east of Hailar (HADA, 1937).

This species is euryhaline species, but has not been found in fresh water, occurring always in sea, brackish, and salt waters.

7. *Brachionus leydigii* CHON var. *tridentatus* SERNOV

Hab.:—The Sungari at Tsitsihar (UÉNO, 1936).

8. *Brachionus angularis* GOSSE

Jap. Name :—*Himetuno-tubowamusi**.

Hab.:—A pond at Hsinking, very rare; shallow lakes in the region of Wutalienchih, very rare; a weedy pond and pools at Hailar, rare. Reservoirs in Kwantung Province (YAMASAKI, 1937); a small shallow pool near Nungan (INUKAI & HADA, 1938); the Sungari at Tsitsihar (UÉNO, 1936).

This euryhaline species is widely spread in Manchurian waters which are generally basic. In Japan this species usually occurs in brackish waters, by no means in acidic ones. Uéno collected the variety of this species, *bidens* Plate, in the Sungari in June, 1934, but the writer could not find it in this study. The specimens of the present materials are intermediate forms between the just mentioned rounded variety and the typical angular form which is observed in brackish waters of Japan.

9. *Brachionus forficula* WIERZEJSKI Fig. 2

Hab.:—A dammed lake in the region of Wutalienchih, rare.

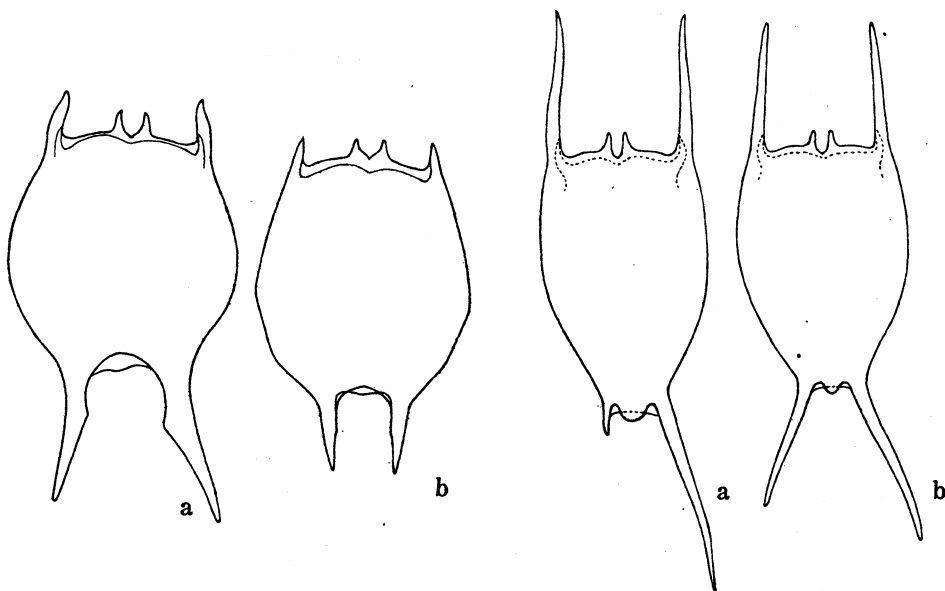
Two formae, *divergens* and *minor* after FADEEV (1925), were secured in the above recorded lake, in which water bloom composed with blue-green algae, *Microcystis* and *Anabaena*, was observed at the time of collection.

10. *Brachionus patulus* MÜLLER
(=*Noteus militaris* (EHRENBERG))

Jap. Name :—*Takogatawamusi*.

Hab.:—A weedy pool at Hailar, very rare.

A reservoir in Kwantung Province (YAMASAKI, 1937).

Fig. 2. *Brachionus forficula* WIERZEJSKI $\times 350$ a. f. *divergens*; b. f. *minor*Fig. 3. *Schizocerca diversicornis* DADAY $\times 120$

a. typical form; b. intermediate one

11. *Schizocerca diversicornis* DADAY Fig. 3Jap. Name:—*Tunowamusi*.

Hab.:—Several shallow lakes in the region of Wutalienchih, common.

The Sungari at Tsitsihar (UÉNO, 1936).

In general, this species more frequently occurred in plankton with scarce phytoplankton than in one with rich phytoplankton. From lakes of Wutalienchih were secured the typical form having short and long posterior spines and intermediate ones, showing gradual changes in the difference of two posterior spines from the former to var. *homoceros* WIERZEJSKI carrying those of an equal elongation. UÉNO recorded these two forms from the Sungari, but the writer has been unable to find the latter with equal posterior spines from the present specimens, though he examined specimens similar to the latter. It is difficult, in fact, to distinctly separate them into two group, because there is the gradual variation as above mentioned.

12. *Platygaster quadricornis* (EHRENBERG)
(=*Noteus quadricornis* EHRENBERG)Jap. Name:—*Nekowamusi*.

Hab.:—A reservoir in Kwantung Province (YAMASAKI, 1937).

13. *Keratella quadrata* (MÜLLER)
(=*Amuraea aculeata* EHRENBERG)

Jap. Name:—*Tuno-kamenokōwamusi*.

Hab.:—Shallow dammed lakes in the region of Wutalienchih, very rare; weedy pools at Hailar, very rare; small pools in the drainage area of the Gan, rare or common.

Everywhere in Manchoukuo (YAMASAKI, 1938); the Sungari at Tsitsihar (UÉNO, 1936).

This is a widespread species of the Rotatoria in Manchoukuo. The writer observed only the typical form and f. *divergens* VOIGT carrying long, outwardly curved posterior spines from the northern part of Manchoukuo, but YAMASAKI found besides these forms, f. *testudo* (EHRENBERG) having short posterior spines different in elongation, f. *valgoides* EDMONDSON & HUTCHINSON with a single right one, and f. *curvicornis* (EHRENBERG) without posterior pines from many localities.

14. *Keratella vulga* (EHRENBERG)

Hab.:—Several localities scattered all over Manchoukuo (YAMASAKI, 1938).

This species is closely allied to *K. quadrata*, but it can be distinguished by difference in width of the ends of the lorica: the anterior end of the lorica in this species is wider than the posterior one, while in the other species the anterior width of the lorica is narrow in comparison with the posterior one. In this species several forms are included. YAMASAKI observed formae *tropica-asymmetrica* (APSTEIN-BARROIS & DADAY), *asymmetrica* (BARROIS & DADAY), *monostrosa* (BARROIS & DADAY) and *reducta* Fadeev with the typical form in Manchurian waters. This species belongs to warm water forms, being widely distributed in the tropical and subtropical regions. According to YAMASAKI's report, this species appears even in the northern part of Manchoukuo in summer; therefore, this is one of the common Rotatoria in the summer plankton of Manchoukuo.

15. *Keratella cochlearis* (GOSSE)

Jap. Name:—*Kamenokōwamusi*.

Hab.:—The reservoir at Hsinking, frequent; several lakes in the region of Wutalienchih, rare or common; a weedy pond and pools at Hailar, rare; a number of small pools in the region of the Gan, rare.

A reservoir in Kwantung Province (YAMASAKI, 1937); a shallow pool in the central plain near Nungan (INUKAI & HADA, 1938);

the Sungari at Harbin and Tsitsihar (UÉNO, 1936).

The variety of this species, *tecta* (GOSSE) which lacks posterior spines, usually found with the typical form in the most materials. This is the most widely distributed species in the Rotatorian fauna described in the present paper.

16. *Anuraeopsis fissa* (GOSSE)

Hab.:—A pond at Hsinking, rare; an eutrophic lake in the region of Wutalienchih, common; a weedy pool at Hailar, rare.

Family MYTILINIDAE

17. *Mytilina ventralis* (EHRENBERG)
(=*Salpina macracantha* GOSSE)

Jap. Name:—*Yoroiwamusi*.

Hab.:—A weedy pond and a pool at Hailar, very rare; a weedy stream of the Gan, very rare.

Var. *brevispina* (EHRENBERG) was also examined in collections from Hailar with the typical form. The variety is different from the typical form only in having shorter spines of the lorica.

Family EUCHLANIDAE

18. *Euchlanis dilatata* EHRENBERG

Jap. Name:—*Haoriwamusi*.

Hab.:—A pond at Hsinking, rare; weedy pools at Khailassu, very rare; dammed lakes in the region of Wutalienchih, very rare; pools and a drain in the area of the Gan, rare.

The Sungari at Tsitsihar (UÉNO, 1936).

19. *Lecane luna* (MÜLLER)
(=*Cathypna luna* (MÜLLER))

Jap. Name:—*Tukigatawamusi*.

Hab.:—A weedy pool at Hailar, common; a small pool in the region of the Gan, very rare.

20. *Lecane scobia* HARRING & MYERS Fig. 4

Hab.:—A shallow lake in the region of Wutalienchih; very rare.

The specimens observed in this research are more

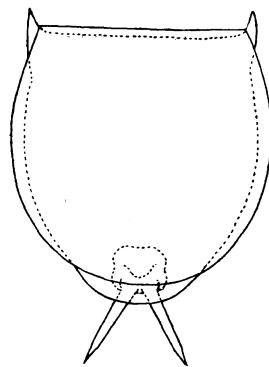


Fig. 4. *Lecane scobia* HARRING & MYERS ×550

or less rotund and smaller than those examined by HARRING & MYERS (1926) from the northern part of Canada.

21. *Monostyla lunaris* (HHERNBERG)

Jap. Name :—*Tukigata-enagawamusi*.

Hab.:—Weedy pools at Khailassu, very rare; shallow lakes in the region of Wutalienchih, very rare; small pools in the drainage area of the Gan, rare.

This species shows variations in the shape of the anterior part of the lorica.

22. *Monostyla closterocerca* SCHMARD A Fig. 5

Hab.:—Weedy pools at Khailassu, very rare; a weedy pond and pools at Hailar, common; small pools and a drain in the region of the Gan, very rare.

This species is obviously a dweller in weedy basins, being found in plankton-catches taken only from such places.

23. *Monostyla furcata* MURRAY Fig. 6

Hab.:—A pond at Hsinking, very rare; a weedy and pools at Hailar, rare.

24. *Monostyla hamata* STOKES Fig. 7

Hab.:—A weedy pond and a pool at Hailar, rare.

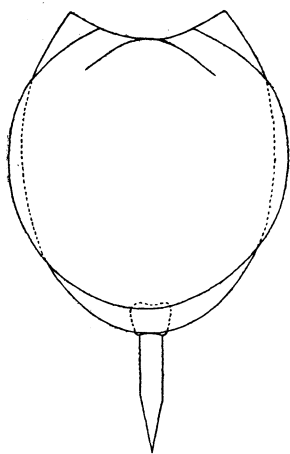


Fig. 5. *Monostyla closterocerca*
SCHMARD A $\times 600$

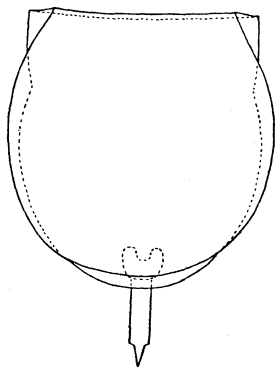


Fig. 6. *Monostyla furcata*
MURRAY $\times 580$

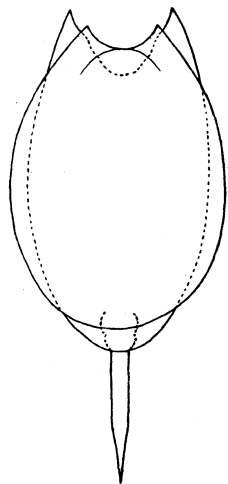


Fig. 7. *Monostyla hamata*
STOKES $\times 550$

25. *Monostyla quadridentata* EHRENBERG Fig. 8

Jap. Name:—*Tuno-utiwawamusi**.

Hab.:—A weedy pond and a pool at Hailar, rare.

The specimens examined in this investigation bore great anterior spines.

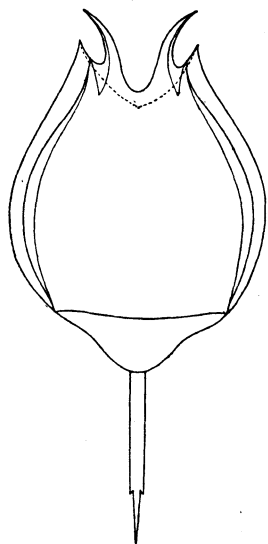


Fig. 8. *Monostyla quadridentata* EHRENBERG
× 330

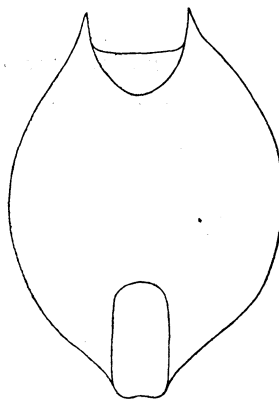


Fig. 9. *Lepadella patella* (MÜLLER)
× 550

Family LEPADELLIDAE

26. *Lepadella patella* (MÜLLER) Fig. 9

Hab.:—A pond at Hsinking, rare; weedy pools at Khailassu, very rare; a ditch in the region of the Gan, very rare.

27. *Colurella bicuspidata* (EHRENBERG)

Hab.:—A pond at Hsinking, rare; a weedy pond and a pool at Hailar; common.

28. *Colurella colurus* (EHRENBERG)

(=*Colurus compressus* LUCKES)

Hab.:—Small pools in the region of the Gan, very rare; a shallow lake in the volcanic region of Wutalienchih, very rare.

Family TRICHOTRIIDAE

29. *Trichotria pocillum* (MÜLLER)

Jap. Name:—*Togenaga-oniwamusi**.

Hab.:—Weedy pools at Khailassu, very rare; a weedy pond and a pool at Hailar, common; a branch stream of the Gan, rare.

30. *Trichotria tetractis* (EHRENBERG)

Hab.:—The Sungari at Tsitsihar (UENO, 1936).

Family TRICHOCERCIDAE

31. *Trichocerca capucina* (WIERZEJSKI & ZACHARIAS)
(=*Rattulus capucinus* (WIERZEJSKI & ZACHARIAS))

Jap. Name:—*Nezumiwamusi*.

Hab.:—Small pools in the drainage area of the Gan, very rare.

It is one of the common wheel animalcules in Japan, but it is very poor in Manchoukuo.

32. *Trichocerca pusilla* (JENNINGS)

Jap. Name:—*Hime-nezumiwamusi**.

Hab.:—The reservoir and a pond at Hsinking, common; dammed lakes in the region of Wutalienchih, rare; a weedy pond and pools at Hailar, very rare.

Being a pelagic form, this species very rarely appeared in the materials obtained from weedy basins.

33. *Trichocerca iernis* (GOSSE)
(=*Rattulus gracilis* (TESSIN))

Hab.:—Shallow lakes in the region of Wutalienchih, very rare.

34. *Trichocerca cylindrica* (IMHOF)

Jap. Name:—*Hosonaga-nezumiwamusi**.

Hab.:—Dammed lakes in the region of Wutalienchih, common; a weedy pool at Hailar, rare.

Reservoirs in Kuwantung Province (YAMASAKI, 1937).

35. *Trichocerca longiseta* (SCHRANK)

Hab.:—Weedy pools at Khailassu, very rare; weedy pools at Hailar, common; a weedy branch stream of the Gan and small pools near it, rare.

All specimens of this species were detected in the materials taken from weedy bodies of water in this research. It is distinct therefore, that this is a member of the inhabitants in the water plant vegetation.

36. *Diurella stylata* EYFERTH

Jap. Name:—*Toge-futaowamusi**.

Hab.:—The reservoir at Hsinking, rare; several lakes in the region of Wutalienchih, common; weedy pools at Hailar, rare.

Shallow pools in the plain near Nungan (INUKAI & HADA, 1938). This is also one of the common species in the Rotatorian fauna of Manchoukuo.

Family GASTROPODIDAE

37. *Ascomorpha saltans* BARTSCH
(=*Sacculus saltans* (BARTSCH))

Jap. Name:—*Midoriwamusi**.

Hab.:—A weedy pool at Hailar, very rare.

Family SYNCHAETIDAE

38. *Synchaeta pectinata* EHRENBERG

Jap. Name:—*Fusawamusi*.

Hab.:—The reservoir and a pond at Hsinking, very rare.

39. *Synchaeta stylata* WIERZEJSKI

Jap. Name:—*Hosoasi-fusawamusi* or *Dorowamusi*.

Hab.:—A weedy pool at Hailar, very rare.

This species is common in Japanese waters, but very rare in Manchurian ones even in summer.

Family POLYARTHRIDAE

40. *Polyarthra trigla* (EHRENBERG)
(=*P. platyptera* EHRENBERG)

Jap. Name:—*Haneudewamusi*.

Hab.:—The reservoir and a pond at Hsinking, rare or frequent; several lakes in the region of Wutalienchih, rare or common; weedy pools and a pond at Hailar, common.

Reservoirs in Kwantung Province (YAMASAKI, 1937); a shallow pool in the central plain near Nungan (INUKAI & HADA, 1938); the Sungari at Tsitsihar (UÉNO, 1936).

This cosmopolitan species occurs also every where in Manchoukuo.

Family PLOESOMIDAE

41. *Ploesoma truncatum* (LEVANDER)

Jap. Name :—*Suziwamusi*.

Hab. :—The reservoir at Hsinking, rare.

Reservoirs in Kwantung Province (YAMASAKI, 1937); the Sungari at Tsitsihar (UÉNO, 1936).

Family ASPLANCHNIDAE

42. *Asplanchna priodonta* GOSSE

Jap. Name :—*Fukurowamusi*.

Hab. :—Some lakes in the region of Wutalienchih, rare; a weedy pool at Hailar, rare.

Reservoirs in Kwantung Province (YAMASAKI, 1937).

43. *Asplanchna brightwellii* GOSSE

Hab. :—The reservoir at Hsinking, rare.

The sungar at Tsitsihar (UÉNO, 1936).

Order FLOSCULARIACEA

Family TESTUDINELLIDAE

44. *Testudinella patina* (HERMANN)
(= *Petrodina patina* (HERMANN))

Jap. Name :—*Hiratawamusi*.

Hab. :—A weedy pond and pools at Hailar, very rare.

45. *Pompholyx complanata* GOSSE

Hab. :—A reservoir in Kwantung Province (YAMASAKI, 1937).

46. *Pompholyx sulcata* HUDSON Fig. 10

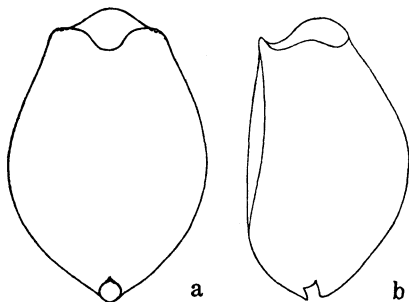


Fig. 10. *Pompholyx sulcata* HUDSON $\times 350$
a. dorsal view; b. side view

Hab. :—Dammed lakes in the region of Wutalienchih, frequent.

This is the commonest species among the Rotatoria of the lakes in the above recorded locality.

Family FILINIIDAE

47. *Filinia passa* (MÜLLER)
(= *Triarthra mystacina* EHRENBERG)

Jap. Name :—*Mituudewamusi*.

Hab. :—A pond at Hsinking, very rare.

48. *Filinia longiseta* (EHRENBERG)

Jap. Name:—*Naga-mituudewamusi*.

Hab.:—The reservoir and a pond at Hsinking, rare; several shallow lakes in the region of Wutalienchih, rare or frequent; a weedy pond and pools at Hailar, rare.

Reservoirs in Kwantung Province (YAMASAKI, 1937); the Sungari at Tsitsihar (UÉNO, 1936).

49. *Pedalia mira* (HUDSON)
(=*Pedalion mirum* HUDSON)

Jap. Name:—*Mizinkowamusi*.

Hab.:—A pond at Hsinking, rare.

Family CONOCHILIDAE

50. *Conochilus unicornis* ROUSSELET

Jap. Name:—*Tuno-temarizwamusi*.

Order COLIOTHECACEA

Family COLLOTHECIDAE

51. *Collotheca mutabilis* (HUDSON)
(=*Floscularia mutabilis* HUDSON)

Hab.:—The reservoir at Hsinking, rare; a weedy pool at Hailar, rare.

Order BDELLOIDA

Family PHILODINIDAE

52. *Rotaria rotatoria* (PALLAS)
(=*Rotifer vulgaris* SCHRANK)

Jap. Name:—*Hirugatawamusi*.

Hab.:—Dammed lakes in the region of Wutalienchih, very rare; a weedy drain in the drainage area of the Gan, rare.

53. *Rotaria neptunis* (EHRENBERG)

Jap. Name:—*Asinaga-hirugatawamusi**.

Hab.:—Shallow lakes in the region of Wutalienchih, very rare.

Conclusion

Our knowledge on the Rotatorian fauna of Manchoukuo is incomplete at present on account of the presence of districts where researches on the Rotatoria have not been made, such as in Johol and the Amur District. In this paper there have been treated the species of Rotatoria hitherto recorded by UENO (1936), YAMASAKI (1937-38), INUKAI & HADA (1938), and the present writer (1937) from the plankton-collections of Manchoukuo and also found by the writer in plankton-catches taken from the central plain and the north-eastern part of this empire. Their distribution is shown altogether in the following table. Most of them are widespread and pelagic forms which comprise eupelagic ones of open water and littoral inhabitants or dwellers of weedy borders, because the writer's collections were mostly made in such small weedy basins.

The features of the Manchurian Rotatorian fauna may be briefly noted as follows: most species are cosmopolitan, while endemic forms are very sparse, and in the Rotatoria of Manchoukuo are included many euryhaline forms, most of which usually occur in fresh and brackish waters, such as *Brachionus capsuliflorus*, *B. calyciflorus*, *B. urceus*, *B. angularis*, *Keratella quadrata*, *K. cochlearis*, *Mytilina ventralis*, *Euchlanis dilatata*, *Lecane luna*, *Monostyla lunaris*, *M. quadridentata*, *Lepadella patella*, *Colurella colurus*, *Trichotria pocillum*, *Trichocerca capucina*, *T. longiseta*, *Synchaeta pectinata*, *S. stylata*, *Polyarthra trigla*, *Asplanchna priodonta*, *Testudinella patina*, *Pompholyx sulcata*, *Filinia longiseta*, *Pedalia mira*, *Conochilus unicornis*, *Collotheca mutabilis*, and *Rotaria rotatoria*. They are all eurythermal as well as euryhaline and widely distributed in the world. A few of them scarcely ever appear even in sea waters; for example, *Testudinella patina* was known from Kiel and *Colurella bicuspidata* from Bergen. *Branchionus plicatilis* which was collected by the writer from a small salt lake in the Mongolian steppe, also belongs to euryhaline forms, however, it is generally found in sea, brackish, and salt waters, not seen in fresh waters.

The occurrence of many euryhaline wheel animalcules in Manchoukuo is probably due to the fact that inland waters of this empire are usually alkaline in pH-rection because of a rather great amount of dissolved alkali salts, excepting the waters of the Great Khingan Mountains which are acidic or nearly neutral, that is to say, Manchurian waters containing more or less amount of alkali salts are similar to brackish ones in properties and compositions. Furthermore, the analogous factor of these waters as an enviromental substance for the Rotatoria is, in fact, explained by the appearance of a marine and brackish form, *B. plicatilis*, in Mongolian salt waters and of *B. angularis* in basic waters. The latter has been usually known only from brackish waters in Japan. It

seems to be due to the fact that Japan has in general no lakes with water containing alkali salts such as Manchurian waters.

It is also a characteristic of the Manchurian Rotatorian fauna that a single tropical and subtropical form, *Keratella valga*, was occasionally found as a stenothermal species among numerous eurythermal ones in the summer plankton taken even from the northern part of Manchoukuo. This fact is probably related to the climate of Manchoukuo which is considerably variable.

A table showing the distribution of the Rotatoria in Manchoukuo.

	South	Central	North	Great Khingan Mts.	Mongolia
1. <i>Notomata aurita</i>	—	—	—	—	+
2. <i>Monommata orbis</i>	—	—	—	+	—
3. <i>Brachionus capsuliflorus</i>	+	+	+	—	—
4. <i>B. calyciflorus</i>	+	+	+	—	—
5. <i>B. urceus</i>	—	+	—	—	+
6. <i>B. plicatilis</i>	—	—	—	—	+
7. <i>B. leydigii</i>	—	+	—	—	—
8. <i>B. angularis</i>	+	+	+	—	+
9. <i>B. forficula</i>	—	—	+	—	—
10. <i>B. patulus</i>	+	—	—	—	+
11. <i>Schizocerca diversicornis</i>	—	+	+	—	—
12. <i>Platylas quadricornis</i>	+	—	—	—	—
13. <i>Keratella quadrata</i>	+	+	+	+	+
14. <i>K. valga</i>	+	+	—	—	+
15. <i>K. cochlearis</i>	+	+	+	+	+
16. <i>Anuraeopsis fissa</i>	—	+	+	—	+
17. <i>Mytilina ventralis</i>	—	—	—	—	+
18. <i>Euchlanis dilatata</i>	—	+	+	+	—
19. <i>Lecane luna</i>	—	—	—	+	+
20. <i>L. scobis</i>	—	—	+	—	—
21. <i>Monostyla lunaris</i>	—	—	+	+	—
22. <i>M. closteroerca</i>	—	—	—	+	+
23. <i>M. furcata</i>	—	+	—	—	+
24. <i>M. hamata</i>	—	—	—	—	+
25. <i>M. quadridentata</i>	—	—	—	—	+
26. <i>Lepadella patella</i>	—	+	—	+	—
27. <i>Colurella bicuspidata</i>	—	+	—	—	+
28. <i>C. colurus</i>	—	—	+	+	—

29. <i>Trichotria pocillum</i>	—	—	—	+	+
30. <i>T. tetractis</i>	—	+	—	—	—
31. <i>Trichocerca capucina</i>	—	—	—	+	—
32. <i>T. pusilla</i>	—	+	+	—	+
33. <i>T. iernis</i>	—	—	+	—	—
34. <i>T. cyāndrica</i>	+	—	+	—	+
35. <i>T. longiseta</i>	—	—	—	+	+
36. <i>Diurella stylata</i>	—	+	+	+	+
37. <i>Ascomorpha saltans</i>	—	—	—	—	+
38. <i>Synchaeta pectinata</i>	—	+	—	—	—
39. <i>S. stylata</i>	—	—	—	—	+
40. <i>Polyarthra trigla</i>	+	+	+	—	+
41. <i>Ploesoma truncatum</i>	+	+	—	—	—
42. <i>Asplanchna priodonta</i>	+	—	+	—	+
43. <i>A. brightwellii</i>	—	+	—	—	—
44. <i>Testudinella patina</i>	—	—	—	—	+
45. <i>Pompholyx complanata</i>	+	—	—	—	—
46. <i>P. sulcata</i>	—	—	+	—	—
47. <i>Fiimia passa</i>	—	+	—	—	—
48. <i>F. longiseta</i>	+	+	+	—	+
49. <i>Pedalia mira</i>	—	+	—	—	—
50. <i>Conochilus unicornis</i>	—	—	+	—	—
51. <i>Collotheca mutabilis</i>	—	+	—	—	+
52. <i>Rotaria rotatoria</i>	—	—	+	+	—
53. <i>R. neptunia</i>	—	—	+	—	—
Number of detected species	14	25	23	14	28

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- . 1938. *Keratella quadrata* (O. F. MÜLLER) and *K. valga* (EHRENBERG) with Special Reference to Those collected in Manchoukuo. Jap. Journ. Limnol., Vol. 8, No. 1.

On a Vole, *Clethrionomys rufocanus bedfordiae* with an Aberrant Coat Colour

By

Tamotsu AIZAWA and Sajiro MAKINO

(相澤保・牧野佐二郎)

With 4 text-figures

A full grown specimen of the vole, *Clethrionomys rufocanus bedfordiae* THOMAS¹⁾ (Microtinae-Muridae) with an anomalous coat colour was found among the specimens collected by the senior author, who has been engaged in an ecological survey of the small rodents in Hokkaido from the standpoint of forest conservation. The occurrence of this colour mutant in the wild rodents is sufficiently rare to justify its being recorded in the following note.

The vole, *Clethrionomys rufocanus bedfordiae* abundantly inhabits Hokkaido with a wide distribution throughout the whole of the area. The normal colour of the pelage of the animal is rufous above, shaded with dispersed blackish hairs, thus representing an agouti pattern, the belly being whitish, with or without buff suffusion, strongly based with slaty (Fig. 1). This species is a representative of the small rodents injurious to agriculture and forestry which are found in Hokkaido. There are, of course, other endemic mice and voles found in this

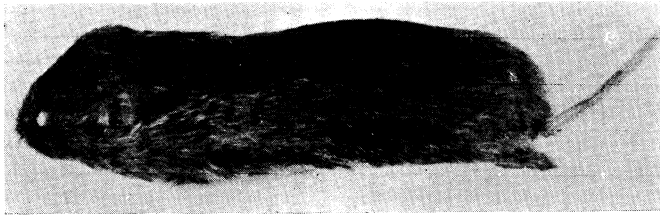


Fig. 1. Normal coat colour. 3/5 x

region which also are injurious to crops and trees; such as *Apodemus speciosus ainu*, *A. geisha* and *Clethrionomys mikado*. But their population is not so evident and being comparatively small is consequently not so destructive in the fields. Owing to their superiority in numbers the damage done by *Clethrionomys*

1) KURODA, N. (1931). Zool. Mag. (Jap.), vol. 43, p. 666.

Trans. Sapporo Nat. Hist. Soc., Vol. XV, Pt. 3, 1938.

rufocanus bedfordiae, especially to the forests, has been enormous. The results of a survey of these injurious animals carried out by the senior author during seven months from May to November, 1931 are tabulated below as a matter of reference.

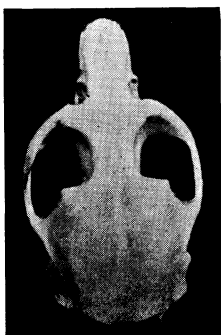
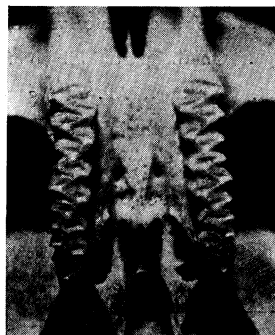
Localities in Hokkaido	Numbers of species collected in 1931 (V-XI)				Total
	<i>Apodemus speciosus ainu</i>	<i>Apodemus geisha</i>	<i>Clethrionomys rufocanus bedfordiae</i>	<i>Clethrionomys mikado</i>	
Sapporo	16	5	106	0	127
Kutchan	18	12	83	2	115
Hiyama	10	5	109	0	124
Hakodate	44	18	392	7	461
Muroran	26	24	143	1	194
Urakawa	10	11	132	0	153
Asahikawa	48	73	418	0	539
Teshio	18	10	85	1	114
Wakkanai	208	107	1723	11	2042
Nakatonbetsu	56	89	823	3	971
Engaru	63	38	393	2	496
Nokkeushi	46	43	265	6	360
Abashiri	32	29	657	7	725
Ob'hiro	37	51	313	1	402
Kushiro	60	31	804	8	903
Nemuro	57	49	901	7	1014
Rikubetsu	23	27	283	0	333
Total	765	622	7630	56	9073

The mutant individual to be described here was collected on 20th December 1937 at Nakashibetsu near Nemuro, Hokkaido. It is a mature female with a body measuring 95 mm in length from the tip of the snout to the base of the tail, and a tail 45 mm long. The coat colour of the specimen is uniformly muddy white both above and below, leaving a median line along the back, including

Fig. 2. Aberrant coat colour. $2/3\times$

the head, which is of a pale ochraceous-buff (Fig. 2). The inner surfaces of the ears are covered with dusky hairs which are slightly tipped with dull grey, giving a darkened appearance. The tail and the upper surface of the hands and feet as well, are uniformly clothed with whitish hairs. As the specimen when examined was not fresh, it cannot be stated with certainty about the colour of the eyes whether they were black or pink. It is most probable, however, that this vole is a sort of mutant, non-agouti probably affected by some diluting factors.

There is nothing abnormal in the skull and teeth of this specimen. For reference they are reproduced in Figs. 3 and 4.

Fig. 3. Skull. $1.5\times$ Fig. 4. Upper molars. $5\times$

According to DUNN ('21) and TOKUDA ('36), a mutational coat colour variation does not seem to be of very frequent occurrence in the Microtinae, only a few cases having been recorded from the wild forms. In fact, the present case seems to be the only one and the first of this kind so far recorded in the

wild Microtinae from Japan¹⁾. Though the senior author has been engaged in an ecological survey of the small rodents of Hokkaido for some ten years past, he has never encountered any other kind of anomaly in coat colour, the present specimen being the sole example of this colour variation so far collected. Recently INUKAI ('34) has reported on three kinds of partial albinos in the Japanese mink, *Mustela itatsi itatsi*, from Hokkaido. He also records that complete and partial albinos of the racoon dog have been frequently found in Hokkaido. In view of the fact that albinos have been found occurring not infrequently in various kinds of wild mammals inhabiting Hokkaido, where an abundance of ice and snow occurs in winter, INUKAI ('34) suggests that this occurrence of colour abnormality may possibly be due to some influence of the environment upon the animal. However, the question is inescapable whether such mutation has occurred on account of the special environment of Hokkaido or whether it is due to some other unknown factors. Examples are at present too scanty to warrant any generalizations and, at least with regard to Muridae, to warrant any supposition.

The writers are greatly indebted to Dr. M. TOKUDA of the Kyoto Imp. University for the information he has kindly supplied and for his valuable advice in respect to recording this case.

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TOKUDA, M. 1936. Genetics of rodents. (Japanese). Tokyo.

1) Recently WATANABE (1937) recorded some unusually spotted individuals of the Japanese field mouse, *Microtus montebelli* from Hondo (Occ. Rep. Ibaraki Agr. Stat., No. 2, 1937).

Arachnida of Manchoukuo III

By

Saburô SAITÔ

(齊藤三郎)

As to the Arachnida fauna of Manchoukuo the writer has reported already 69 species of spiders and 5 of harvestmen from Jehol¹⁾ and from the district along the South-Manchuria Railway²⁾. On September of 1937, Prof. Dr. T. INUKAI brought back a considerable number of spiders and harvestmen with a large collection of the other animals from his journey to Manchoukuo and Inner Mongolia as far as Kulumpeierh (呼倫貝爾) of Hei-lung-kiang (黑龍江省). These valuable materials were put at my disposal for systematical study through his courtesy. For this I wish here to express my heartiest thanks to Prof. T. INUKAI.

Of 20 species the following 13 species of spiders and 1 of harvestmen are referred again to the fauna of Manchoukuo, while the 6 listed afterwards are new;

1. *Gnaphosa sinensis* SIMON

Gnaphosa sinensis SIMON :—1880, Ann. Soc. ent. Fr., 5 ser., X, 121.

Loc. 1 ♀, the basin of the river Gan (根河), Sept. 8.

Dist. China (Pepin), Manchoukuo (Cheng-te, Chao-yang, Harbin).

2. *Tibellus oblongus* (WALCKENAER)

Aranea oblonga WALCKENAER :—1802, Faune Par., II, 228.

Loc. 2 ♀ ♀ (subadult), Wonfu (王府), Aug. 29, 30.

Dist. Manchoukuo (Hsin-king), U.S.A., Alaska, Europe, China (Pepin), Japan (Hokkaidô, the Southern Kurile Islands).

3. *Araneus adiantus* WALCKENAER

Aranea adianta WALCKENAER :—1802, Faune Par., II, 199.

Loc. 2 ♀ ♀ (subadult), Wonfu, Aug. 29, 30.

Dist. Manchoukuo (Ai-tao-tzu-ling, Peh-ying-fang, Schuang-ta-shan, Weng-niu-te, Leo-suu-ton, Hsin-king, Kai-yuan), Japan (Hokkaidô, Southern Saghalien), Siberia, Europe.

4. *Araneus cornutus* CLERCK

Araneus cornutus CLERCK :—1757, Sv. Spindl., 39.

Loc. 1 ♀, the basin of the river Gan, Sept. 8.

1) Report of the First Sc. Exped. to Manchoukuo, Sec. V, Div. I, Pt. III, Arts. 11, 12, 1936.

2) Annot. Zool. Jap., Vol. 16, 1937.

Trans. Sapporo Nat. Hist. Soc., Vol. XV, Pt. 3, 1938

Dist. Manchoukuo (Harbin), Japan (Southern Saghalien, Hokkaidô), U.S.A., Europe.

5. *Araneus hamatus* CLERCK

Araneus hamatus CLERCK :—1757, Sv. Spindl., 51.

Loc. 1 ♀ (subadult), Wonfu, Aug. 29, 30.

Dist. Manchoukuo (Shuang-ta-shan), Europe.

6. *Eucta chinensis* CHAMBERLIN

Eucta chinensis CHAMBERLIN :—1924, Proc. U.S. Nat. Mus., LXIII, 12.

Loc. 3 ♀ ♀ (subadult), Wonfu, Aug. 29, 30.

Dist. China, Manchoukuo (Chao-yang).

7. *Agelena labyrinthica* (LINNAEUS)

Aranea labyrinthica LINNAEUS, 1758, Syst. Nat., Ed. 10, I, 620.

Loc. 1 ♀, the basin of the river Gan, Aug. 8.

Dist. Manchoukuo (Chao-yang, Shuang-ta-shan, Leo-sun-ton, An-shan, Kai-yuan), U.S.A., Europe.

8. *Agelena opulenta* L. KOCH

Agelena opulenta L. KOCH :—1877, Verhandl. d.k.k. Zool. bot. Ges., XXVII, 757.

Loc. 1 ♀, Khailassu (哈拉蘇), Sept. 12.

Dist. Manchoukuo (Harbin, An-shan, Siong-yu-cheng, Hsin-king, Pehying-fang), Japan (Kyûsyû, Honsyû, Hokkaidô).

9. *Tegenaria Derhamii* (SCOPOLI)

Aranea Derhamii SCOPOLI, 1763, Entom. Carn., 400.

Loc. 1 ♀, Khailar (海拉爾), Sept. 10.

Dist. Manchoukuo (Leo-sun-ton, Hsin-king, Chao-yang, Shuang-ta-shan), U.S.A., Europe.

10. *Dolomedes fimbriatus* (CLERCK)

Araneus fimbriatus CLERCK :—1757, Sv. Spindl., 106.

Loc. 1 ♀, 4 subadults, Khailassu, Sept. 12.

Dist. Manchoukuo (Chang-shan-yu, Cheng-te), Europe.

11. *Lyccsa monticola* (CLERCK)

Araneus monticola CLERCK :—1757, Sv. Spindl., 91.

Loc. 2 ♀ ♀, Khailar, Sept. 9.

Dist. Manchoukuo (Hsin-king), Japan (Hokkaidô), Siberia, Europe.

12. *Lycosa T-insignita* BÖS. et STRAND

Lycosa T-insignita BÖSENBERG et STRAND :—1906, Abhandl. senckenb. Naturf. Ges., XXX,

Loc. 1 ♀, the basin of the river Gan, Aug. 8.

Dist. Manchoukuo (Peh-wing-fang, Shuang-ta-shan, Cheng-te, Hsin-king), Japan (Hokkaidô, Honsyû, Kyûsyû, Formosa).

13. *Oxyopes sertatus* L. KOCH

Oxyopes sertatus L. KOCH:—1877, Verhandl. d.k.k. zool. bot. Ges., XXVII, 779.

Loc.; ♂, 1 ♀ (subadult), Khailassu, Sept. 11, 12.

Dist. Manchoukuo (Tieh-ling), Japan (Formosa, Honsyû, Kyûsyû).

14. *Opilio trispinifrons* ROEWER

Opilio trispinifrons ROEWER:—1911, Zool. Jahrb., Syst., V, 596.

Loc. Khailassu, Sept. 12.

Dist. Manchoukuo (Weng-niu-te), China (Pepin).

The following 6 are recorded for the first time from the Manchurian fauna;

15. *Philodromus spinitarsus* SIMON

Philodromus spinitarsus SIMON:—1895, BULL. Soc. ent. Fr., LXII.

Loc. 1 ♂ (subadult), Handshur (什珠爾), Sept. 6.

Dist. Japan (Kyûsyû), China.

16. *Xysticus ephippiatus* SIMON

Xysticus ephippiatus SIMON:—1880, Ann. Soc. ent. Fr., 5 ser., X, 107.

Loc. 5 ♀ ♀ (immature), Wonfu, Aug. 29, 30.

Dist. China (Pepin, Suifu, Soochow), Japan (Hokkaidô, Honsyû, Kyûsyû).

17. *Xysticus striatipes* L. KOCH

Xysticus striatipes L. KOCH:—1870, Beitr. Kennt. Ar.

Loc. 1 ♀, Handshur, Sept. 9, 11 ♂ ♂, 10 ♀ ♀ (subadult), Wonfu, Aug. 29, 30.

Dist. Europe.

18. *Thanatus miniaceus* SIMON

Thanatus miniaceus SIMON:—1800, Ann. Soc. ent. Fr., 5 ser., X, 110.

Loc. 11 ♀ ♀ (subadult), Wonfu, Aug. 29, 30.

Dist. China (Pepin).

19. *Larinia punctifera* BÖS. et STRAND

Larinia punctifera BÜSENBURG et STRAND:—1906, Verhandl. senckenb. Naturf. Ges., XXX, 212.

Loc. 4 ♀ ♀ (subadult), Wonfu, Aug. 29, 30.

Dist. Japan (Honsyû).

20. *Lutica* sp.

Loc. 1 ♀ (subadult), Wonfu, Aug. 29, 30.

Note sur le Genre *Nysson* LATREILLE au Japon et en Corée (*Hym., Nyssonidae*)

Par

Keizô YASUMATSU

(安 松 京 三)

Les espèces de *Nysson* acutuellement connues de l'Extrême-Orient, particulièrement de l'Empire du Japon, sont peu nombreuses. Ce genre mériterait de retenir spécialement l'attention des chercheurs de ces régions.

D'après le Dr. V. GUSSAKOVSKIJ (1932), deux espèces de *Nysson* LATREILLE se rencontrent dans la Région de l'Ussuri, à savoir, *Nysson malaisei* GUSSAKOVSKIJ et *Nysson fraterculus* GUSSAKOVSKIJ.

A ma connaissance, on compte au Japon et en Corée trois espèces de *Nysson*, qui peuvent se reconnaître par les tableaux suivants :

1. Antennes de 13-articles. Extrémité de l'abdomen tronquée, à chaque angle apparaît une petite pointe obtuse (♂) 2.
Antennes de 12-articles. Extrémité de l'abdomen aiguë (♀) 4.
2. Dernier article des antennes très distinctement courbe, avant-dernier article fortement épaissi *Nysson maculatus*.
Dernier article des antennes de forme simple 3.
3. Avant-dernier article des antennes fortement épaissi. Ocelles postérieurs aussi distants l'un de l'autre qu'ils le sont du bord interne des yeux. Le 1^{er} tergite abdominal court, plus large que long. Le 2^e tergite abdominal environ 2 fois plus large que long. Cellule anale de l'aile postérieure se terminant au delà du point de départ de la nervure cubitale. Extrémité de l'abdomen tronquée droit entre chaque angle de la troncature. Vertex et mésonotum présentant des points assez forts et légèrement espacés. Le 2^e sternite abdominal très fortement ponctué *Nysson trimaculatus*.
Avant-dernier article des antennes non fortement épaissi. Ocelles postérieurs plus rapprochés l'un de l'autre qu'ils ne le sont du bord interne des yeux. Le 1^{er} tergite abdominal étroit, au moins aussi long

* Cette espèce a été recueillie, en 1935, aux environs de Fukuoka par M. M. FUJINO et M. I. KAWAHARA.

que large. Le 2^e tergite abdominal moins de 2 fois plus large que long. Cellule anale de l'aile postérieure se terminant avant le point de départ de la nervure cubitale. Extrémité de l'abdomen sensiblement arrondie entre chaque angle de la troncature. Vertex et mésonotum présentant des points petits, bien serrés, un peu rugueux. Le 2^e sernite abdominal relativement faiblement ponctué

- *Nysson malaisei*.
 4. Bord antérieur du clypéus inerme. Scutellum jaune. Le 1^{er} segment abdominal rouge *Nysson maculatus*.
 Scutellum noir. Abdomen noir 5.
 5. Bord antérieur du clypéus inerme. Ocelles postérieurs aussi écartés entre eux qu'ils le sont des yeux. Le 1^{er} tergite abdominal court, environ 2 fois plus large que long. Vertex et mésonotum offrant des points très forts et relativement espacés *Nysson trimaculatus*.
 Bord antérieur du clypéus portant deux petites carènes qui le dépassent et forment 2 petits tubercules. Ocelles postérieurs plus rapprochés l'un de l'autre qu'ils ne le sont du bord interne des yeux. Le 1^{er} tergite abdominal étroit des points petits, bien serrés, un peu rugueux
 *Nysson malaisei*.

1. *Nysson malaisei* GUSSAKOVSKIJ

1932 *Nysson malaisei* GUSSAKOVSKIJ, Arkiv för Zool., Bd. 24 A, No. 10, p. 31, ♀ ♂.

1935 *Nysson malaisei* YASUMATSU, Mushi, vol. 8, no. 2, p. 107.

1 ♀, 24. V. 1935, Tachibanayama, Chikuzen, Kyûshû, M. M. FUJINO et M. I. KAWAHARA leg., collection de l'Université Impériale de Kyûshû.

1 ♀, 23. VII. 1930, Jôzankei, Hokkaidô, M. K. TAKEUCHI leg., collection du Laboratoire d'Entomologie de TAKEUCHI.

1 ♂, 21. VI. 1931, Kurobe, Honshû, M. K. TAKEUCHI leg., coll. Lab. d'Ent. TAKEUCHI.

Habitat: Ussuri, Japon proprement dit (Hokkaidô, Honshû, Kyûshû).

Cette espèce est nouvelle pour la faune de Honshû et de Hokkaidô.

2. *Nysson maculatus* (FABRICIUS)

1793 *Sphex maculatus* FABRICIUS, Ent. Syst., vol., II, p. 215, ♀.

1805 *Nysson maculatus* LATREILLE, Hist. nat., vol. VIII, p. 306, ♀.

1887 *Nysson maculatus* HANDLIRSCH, Sitzb. d. kais. Akad. d. Wissensch., I. Abth., Bd. XCV, p. 131, ♀ ♂.

1 ♂, 27. VII. 1935, Mosanrei, Corée, M. K. TAKEUCHI leg., coll. Lab. d'Ent. TAKEUCHI.

Habitat: Toute l'Europe, jusqu'en Scandinavie, Corée.

Cette espèce est nouvelle pour la faune de Corée.

3. *Nysson trimaculatus* (ROSSI)1790 *Crabro trimaculatus* ROSSI, Fauna Etrusca, vol. II, p. 95, ♂.1805 *Nysson trimaculatus* LATREILLE, Hist. nat., vol. VIII, p. 306, ♂.1887 *Nysson trimaculatus* HANDLIRSCH, Sitzb. d. kais. Akad. Wissensch., I. Abth., Bd. XCV, p. 131, ♀ ♂.

1 ♀, 29. VII. 1932, Minomo, Settsu, Honshû, M. K. IIDA leg.

2 ♂ ♂, 15. VIII. 1937, Nikkô-Yumoto, Shimozuke, Honshû, M. T. ESAKI et K. YASUMATSU leg., coll. l'Univ. Imp. Kyûshû.

Habitat: Toute l'Europe, Afrique du Nord, Japon proprement dit (Honshû).

Cette espèce est nouvelle pour la faune du Japon.

Enfin, je remercie également M. le Professeur TEISO ESAKI, M. A. CRÉVE-COEUR, M. KICHIZO TAKEUCHI et M. KICHINOSUKE IIDA pour les exemplaires qu'ils ont bien voulu me soumettre.

摘 要

日本及び朝鮮産ドロバチモドキ属に就いて

本文に於ては日本及び朝鮮産のドロバチモドキ属3種を報告した。それらの和名を示せば次の如くである。

<i>Nysson malaisei</i> GUSSAKOVSKIJ	オホドロバチモドキ	(新 稱)
<i>Nysson maculatus</i> (FABRICIUS)	コドロバチモドキ	(新 稱)
<i>Nysson trimaculatus</i> (ROSSI)	キマダラドロバチモドキ	(新 稱)

Eine neue *Trinophylum*-Art von den Bonin-Inseln (*Coleoptera: Cerambycidae*)

Von

Masaki MATSUSHITA und Kazuo OOBAYASHI

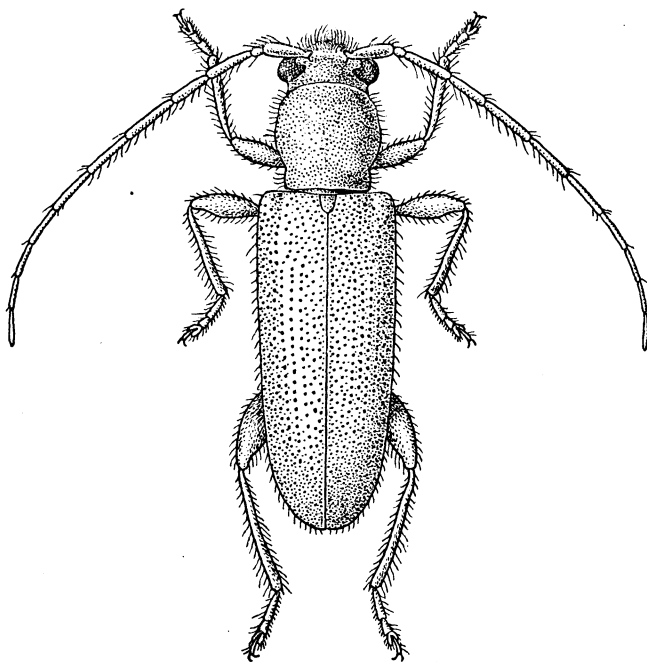
(松下眞幸・大林一夫)

Mit 1 Textfigur

Neulich hatten wir Gelegenheit die *Cerambyciden*-Sammlung von K. OOBAYASHI, dem Mitarbeiter dieser Abhandlung zu besichtigen. Wir entdeckten darin eine neue *Trinophylum*-Art, welche von Herrn N. TOSAWA auf Chichijima von der Bonin-Inselgruppe gefunden wurde. Bisher sind von der *Trinophylum*-Art aus Nordindien und den Bonin-Inseln nur je eine Art bekannt. Somit vervollständigt sich die Artenzahl der Gattung *Trinophylum* auf insgesamt drei.

Trinophylum barbatum sp. nov.

Der ganze Körper schimmernd gelbbraun, der Kopf aber etwas dunkler gefärbt, mit abstehenden gelben Haaren spärlich besetzt. Kopf zwischen den Fühlerhöckern seicht eingedrückt, auf dem Scheitel äusserst fein und sehr dicht punktiert; Stirn kurz, viel breiter als lang, mit einer feinen Längslinie in der Mitte versehen. Mundteil mit langen, gelben, abstehenden Haaren besetzt. Fühler beim Männchen fast so lang wie der Körper, unten spärlich bewimpert; das 1. Glied gegen die Spitze hin schwach verdickt, aber an der Basis stark abgeschnürt, und schwach gebogen; das 2. Glied ein wenig länger als breit; das 4. Glied deutlich kürzer als das 3. oder 5.; Glieder 6. und 7. gleich lang, beide etwas kürzer als das 5., Glieder 7.—11. an Länge allmählich abnehmend. Halsschild fast so lang wie breit, an den Seiten schwach abgerundet, aber Basalteil plötzlich stark verschmälert; Pronotum glatt, undeutlich sehr fein und spärlich punktiert, fast eben, aber vor der Basis seitlich schwach gewölbt, hinter dem Vorderrand seicht eingedrückt. Schildchen zungenförmig, braun. Prosternum schwach quer gerunzelt; Prosternalfortsatz eben, eher schmal, an der Spitze etwas erweitert; Gelenkhöhlen der Vorderbeine rundlich, hinten geöffnet. Gelenkhöhlen der Mittelbeine nach Aussen geschlossen; Mesosternalfortsatz breit, schwach gewölbt, an der Spitze erweitert. Flügeldecken beinahe zweimal so lang als an der Basis breit, gegen die Spitze hin schwach verengt, an der Spitze zusammen abgerundet; stark, mässig fein, und teilweise gereiht punktiert.



Trinophylum barbatum sp. nov. ×8

Abdomen glatt, sehr fein punktiert. Beine mässig lang; Schenkel an der Basis gestielt, am Apikalteil spindelförmig stark verdickt; Tarsen unten grau dicht behaart, das 1. Glied der Hintertarsen so lang wie die zwei folgenden zusammen. Länge: 8 mm. Breite: $2\frac{1}{2}$ mm.

Holotypus: 1 ♂, Chichi-jima von den Bonin-Inseln, 11. V, 1918, gesammelt von N. TOSAWA.

Diese Art ist von *Trinophylum boninense* MATSUMURA et MATSUSHITA durch die Halsschildform und die Punktierung, ferner von *Trinophylum cribratum* BATES durch die Punktierung sowie die Behaarung leicht unterscheidbar.

摘 要

小笠原群島産マルクビヒメカミキリ属の新種

最近筆者の1人大林が松下に調査を依頼した多数の天牛類の標品中に、父島産の珍しい1種があつた。研究の結果新種と認められるので下記の如き新種名を與へて發表した。

Trinophylum barbatum MATSUSHITA et OOBAYASHI

チヂジママルクビヒメカミキリ (新 稱)

Die Lymexyloniden, schädlich an Sachalintannen und Ezofichten in Sachalin und Hokkaido

Von

Hiromichi KÔNO

(河野廣道)

Mit 2 Figuren

Dank der Unterstützung der Hattori-Hôkôkai-Stiftung konnte ich mir seit dem Jahre 1935 auch die Untersuchung der schädlichen Insekten der *Abies*- und *Picea*-Arten zur Aufgabe stellen.

In dieser Zeit habe ich als Schädlinge an *Abies sachalinensis* (Todomatsu) und *Picea jezoensis* (Ezomatsu) in Sachalin und Hokkaido 2 Arten der Lymexyloniden gefunden.

Die beiden Arten machen ziemlich grossen technischen Schaden an oben genannten Bäumen.

Hiermit drücke ich der „Hattori-Hôkôkai“ für die Hilfe meinen innigsten Dank aus.

Bestimmungstabelle der Arten

- 1'' Fühler beim ♂ doppelt gewedelt. Das 3te Maxillartasterglied des ♂ mit einem Anhang. *Hylecerus flabellicornis* (SCHNEIDER)
1' Fühler beim ♂ gesägt. Das 3te Maxillartasterglied ohne Anhang.
..... *Hylecoetus matsushitai* KÔNO, n. sp.

Hylecoetus matsushitai n. sp.

Hylecoetus cossis KÔNO (nec LEWIS), Kontyû, III, p. 155 (1929) (partim); id., Hattori-Hôkôkai Kenkyu Shoroku, V, p. 272, Pl. I, f. 4 (1938); TAMANUKI, Kontyû, VII, 2, p. 92, f. B (1933).

♂. Rotgelb bis rotbraun; Augen, Mittel- und Hinterbrust schwarz, Fühler grösstenteils (mit Ausnahme der basalen 2-4 Glieder) und Flügeldecken an der Spitze verdunkelt oder schwarz, manchmal auch Bauch an der Basis und die Hinterschenkel schwarz. Behaarung gelb, kurz und mässig dicht.

Kopf breiter als lang, dicht punktiert; Scheitel in der Mitte mit einem Punktstrich. Augen gewölbt, spärlich aufstehend behaart. Fühler gesägt; das 3te Glied dreieckig, viel grösser als das 2te. Maxillartaster einfach; das 2te Glied verkehrt kegelförmig, viel länger als das 3te, das 3te etwas kürzer als breit, ohne Anhang. Halsschild quer, etwas breiter als der Kopf, an der Basis

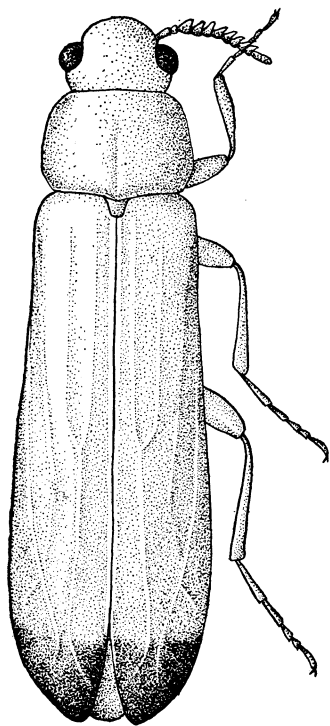


Fig. 1. *Hylecoetus metsushitai*
sp. nov., ♂

gerandet, vor der Basis in der Mitte mit einer kurzen Längsfurche; die Punktierung weitläufig. Flügeldecken parallelschiff, je mit 4 deutlichen Längsnerven; die Punktierung sehr dicht.

♀. Rotgelb; Augen schwarz, Kopf, Mittel- und Hinterbrust sowie auch die Spitze der Flügeldecken verdunkelt oder schwarz. Fühler nicht gesägt. Das 2te Maxillartasterglied kaum länger als das 3te.

Körperlänge: 7–15 mm. (♂, ♀).

An *Abies sachalinensis* und *Picea jezoensis*. Frassbild und Larvengang wie bei *Hylecerus flabellicornis* (SCHNEIDER).

Holotypus — ♂, Shari in Hokkaido, 24/VI. 1928, an *Abies sachalinensis*, gesammelt von M. MATSUSHITA.

Allotypus — ♀, Shari, 24/VI. 1928, an *Abies sachalinensis*, ges. von M. MATSUSHITA.

Paratypen — 4 ♂, Shari, 24/VI. 1928, ges. M. MATSUSHITA; 1 ♂, Horo in Sachalin, 22/VII. 1932, ges. von H. KÔNO; 5 ♂, Horo, an *Picea jezoensis*, ges. von H. KÔNO.

Diese neue Art ist der *H. cossis* LEWIS sehr ähnlich, aber Flügeldecken mit 4 Längsnerven (bei *H. cossis* nur mit 3 Längsnerven) und Kopf beim ♂ nicht schwarz.

Geographische Verbreitung: Sachalin; Hokkaido.

Japanischer Name: *Matsushita-tsutsushinkui*.

***Hylecerus flabellicornis* (SCHNEIDER)**

Lymexylon flabellicornis SCHNEIDER, Neu st. Mag., I, 1, p. 109 (1791).

Hylecoetus (Hylecerus) flabellicornis KIESENWETTER, Naturg. Ins. Deutschl., IV, p. 705 (1863).

Hylecoetus flabellicornis TAMANUKI, Kontyu, VII, 2, p. 92, f. A; KÔNO, Hattori Hôkôkai Kenkyu Shoroku, V, p. 272 (1938).

Diese Art ist in Sachalin nicht selten. Die mir vorliegenden Exemplare stimmen meistens in der Färbung mit dem europäischen Stück überein, aber einige ♂ sind fast ganz schwarz gefärbt.

Den Käfer habe ich sowohl an Stümpfen als auch am unteren Teil des Stammes von etwa 25-35 cm dicken Ezofichten (*Picea jezoensis*) gesammelt.

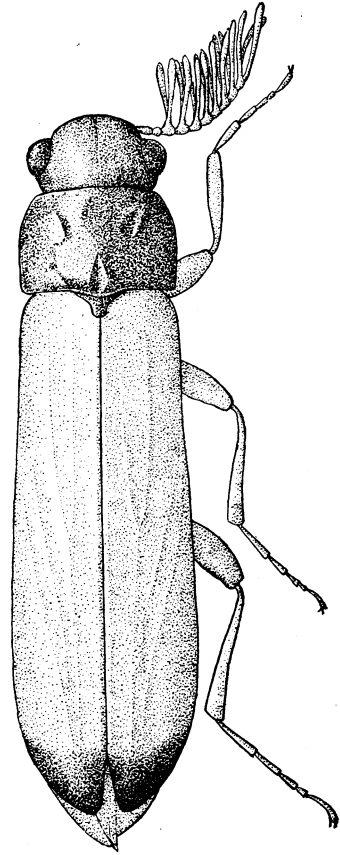
Als Begleiter dieses Käfers fand ich oft *Hylecoetus matsushitai* KÔNO.

Fundort: Sachalin—Horo, an *Picea jezoensis*.

G. V.: Sachalin; Europa.

J. N.: *Kushishige-tsutsushinkui*.

Fig. 2. *Hylecerus flabellicornis*
(SCHNEIDER), ♂



トドマツ・エゾマツに有害なるツツシンクヒ科の甲蟲

(トドマツ・エゾマツ類の害蟲調査報告 第10報)

トドマツ、エゾマツ類を害するツツシンクヒ科の甲蟲は本邦領土内に次の2種を産する。

1. *Hylecoetus matsushitai* KÔNO, n. sp. マツシタツツシンクヒ (新種)

樺太及び北海道に産す。

2. *Hylecerus flabellicornis* (SCHNEIDER) クシヒゲツツシンクヒ

樺太に産す。

前者は本邦特有の種類で、今回始めて新種なることが判明したものである。依つて筆者は本種の最初の発見者である松下眞幸博士の功績を記念する爲にマツシタツツシンクヒと命名した。

兩種共新鮮な伐木や伐株に蠢入して工藝的に大害を加へる。

終りに、研究費の一部を補助せられたる財団法人服部報公會に對し深謝の意を表する。

注 意

本會に對する總ての書信は北海道帝國大學
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