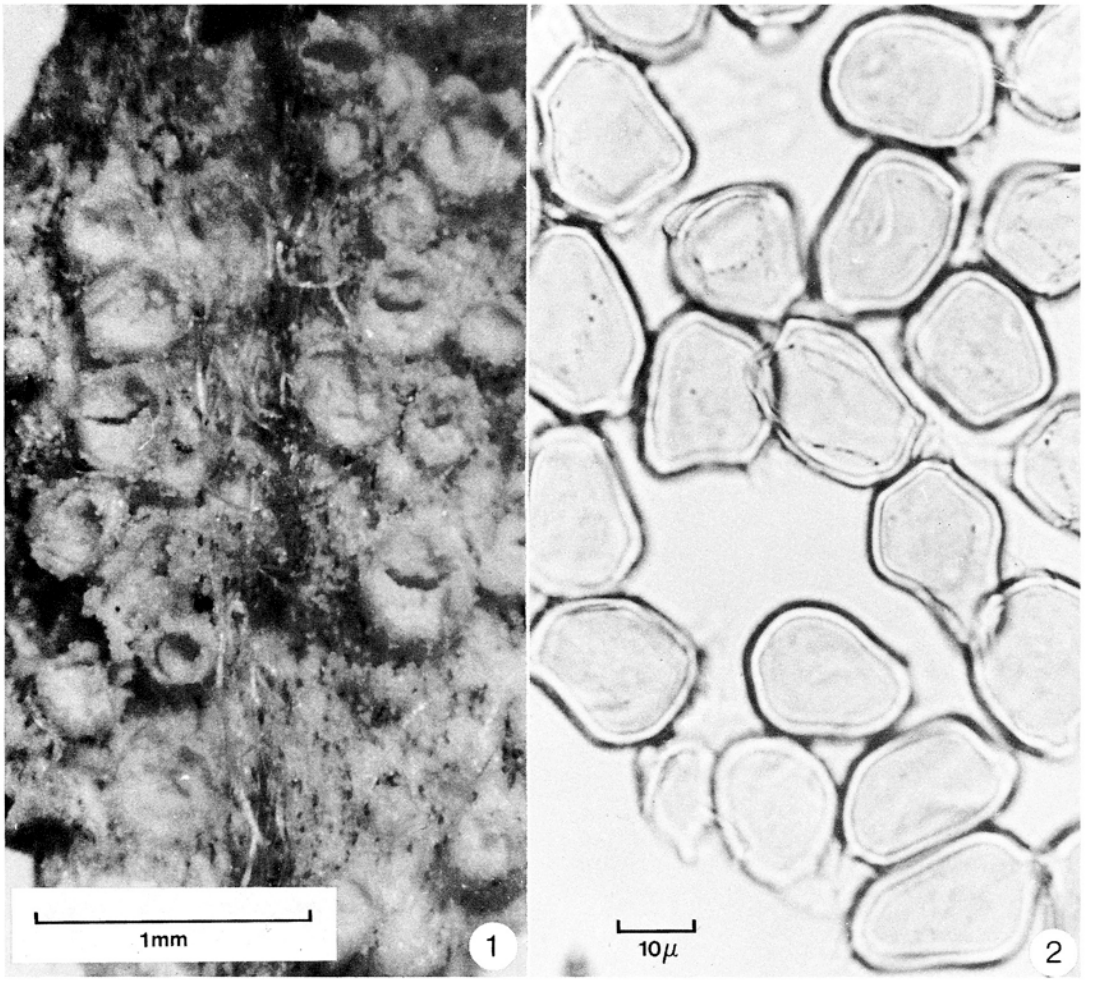
UROMYCES LAPPONICUS



1, Underside of leaflet of type of var. *oxytropis* showing lack of pycnia (confirmed by sections); 2, teliospores, showing faint warts and ridges (cf. *U. phacae-frigidae*).

(a) **Uromyces lapponicus** Lagerh., Bot. Notiser 1890: 274. 1890, var. **lapponicus**.
= *Uromyces carneus* Hariot, Journ. de Bot. 7: 376. 1893.

PYCNIA systemic, hypophyllous, among aecia, conspicuous, ca. 10-40(-65) per leaflet. AECIA systemic, mainly hypophyllous. AECIOSPORES 17-26(-27.5) μ long, (12-)13-19 μ wide; walls 0.4-0.8(-1.0) μ excluding warts, hyaline; warts 0.3-0.6 μ high, 0.2-0.5(-0.7) μ diam.; no pore plugs; no visible germ-pores. TELIA mainly hypophyllous, scattered. TELIOSPORES (cleared) (17.5-)21.5-31(-33) μ long, (15.5-)17-25 μ wide, globose to ellipsoid; walls (1.0-)1.3-2.2(-2.5) μ (thicker at pores), deep yellow-brown, with generally faint warts or ridges 0.2-0.4(-0.6) μ high, 0.4-0.8 μ wide, scattered or occasionally tending to be in rows or forming broken ridges; germ-pores apical - 1/3(-1/2) depressed, with yellow cap 0.8-1.7(-2.0) μ high, (5.5-)7-10(-11) μ diam.; pedicels hyaline, deciduous.

HOSTS: *Astragalus*.

DISTRIBUTION: Quebec, Alberta, Franklin Dist., Northwest Terr.

COLLECTIONS: *Astragalus aboriginum* Richards., Alta, Kananaskis, 11 July 1969, DAOM 130394, 130393 (Parmelee 4290, 4291); *A. eucosmus* Robins., Que., Larch R. ca. 57°40′N 70°W, 10 Aug. 1945, DAOM 19199 (Dutilly & Lepage 14594); *A. richardsonii* Sheld . (*A. aboriginorum* auctt. p.p., non *A. aboriginorum* Richards.), Franklin Dist., N.W.T., Victoria I., Cambridge Bay, 12 Aug. 1959, DAOM 66857 (Savile, Calder & Kukkonen 3939); *A. robbinsii* (Oakes) Gray var. *occidentalis* S. Wats. (*A. macounii* Ryd.), Alta, Jasper Natl. Park, Sunwapta Pass, 9 July 1939, DAOM 97285 (Moss 4901).

(b) **Uromyces lapponicus** Lagerh. var. **oxytropis** Savile **var. nov.**

A varietate *lapponico* differt PYCNIIS nullis; AECIOSPORIS plerumque majoribus, 17-29(-31)((-37)) μ long. (12-)14.5-24.5(-26) μ lat.

HOSTS: *Oxytropis.*

DISTRIBUTION: Newfoundland, Quebec, Districts of Keewatin, Mackenzie and Franklin in N.W.T., Yukon Terr.

COLLECTIONS: *Oxytropis campestris* (L.) DC. var. *terrae-novae* (Fern.) Barneby, Nfld.: at or near St. Anthony, 5 specimens incl. 8 July 1951, DAOM 140003 (Savile & Vaillancourt 2124 **aecial topotype** and 14 Aug. 1951, 140001 (S. & V. 2862 TYPE, isotypes to BPI, E, FH, H, IMI, LE, MICH, O, PRC, PUR, TRTC, UC, UPS, ZT); Que., Fort Chimo, 13 Aug. 1948, 25964 (Calder 2567). *O. maydelliana* Trautv., Franklin Dist.: Baffin I., Frobisher Bay, 30 June 1948, 25960 (Senn 3663), July 1948, 25962 (Calder 2038); Melville Pen., Ross Bay, 19 July 1948, 25961 (Cody 1431); Boothia Pen., Spence Bay, 21 Aug. 1951, 140002 (Chilcott 36); Victoria I., Cambridge Bay, 12 Aug. 1959, 66858 (Savile et al. 3938); Mackenzie Dist.: Reindeer Sta. near Inuvik, 4 July 1957, 140009 (Cody & Ferguson 9808); Bernard Harbour, 3 July 1916, DAOM (Herb. Dearn., Can. Arct. Exped.); Keewatin Dist.: Chesterfield, 21 July 1950, 25129 (Savile & Watts 1057); Coral Harbour, 3 July 1948, 25963 (*Cody 1128*); Yukon Terr.: Richardson Mtns., 8 July 1962, 90248 (Calder 34066). *O. nigrescens* (Pall.) Fisch., Yukon Terr.: Ogilvie Mtns., 29 June 1960, 127876 (Calder & Gillett 26013); NE Whitehorse, 15 June 1968, 126082 (Porsild 1352); NW Dawson, 10 July 1949, 23663 (Calder & Billard 3595). *O. viscida* Nutt. var. *hudsonica* (Greene) Barneby, Keewatin Dist., Coral Harbour, 9 Aug. 1948, 25959 (Cody 1967A).

NOTES: Pycnia are uniformly lacking on all *Oxytropis* specimens seen, including ones on several hosts in U.S.A., *O. campestris* in Finland and *O. mertensiana* in northern Urals. Some aecial specimens, e.g. Myc. Sax. Exs. 283 on *O. campestris* and 996 on *O. sericea*, were issued as "OI", but are completely without pycnia. This distinction is thus clearly genetic, rather than a phenotypic expression of unfavorable climate: var. *lapponicus* bears pycnia as far north as Cambridge Bay (69°03′N on *Astragalus richardsonii*), and var. *oxytropis* lacks them as far south as New Mexico. Some aecial specimens of var. *oxytropis* have appreciably larger spores than those of var. *lapponicus*, but this distinction is not constant. There are no appreciable teliospore differences. Telia are rare in the arctic and probably seldom if ever function. A few mostly immature teliospores of var. *lapponicus* were found on *A. richardsonii* at Cambridge Bay (Savile et al. 3939) on leaves of the previous year, but there was no trace of germination. One arctic collection of var. *oxytropis*, on *O. viscida* var. *hudsonica* from Coral Harbour (*Cody 1967A*) consists of telia. No telia have been seen on any collection on *O. maydelliana* even from subarctic sites. The report by Arthur (Manual, p. 303, 1934) of *U. lapponicus* on *Phaca frigida* (as from a location in Dolphin and Union Strait!) is based on two collections from the Canadian Arctic expedition, cited above, both definitely on *O. maydelliana*. The flowers of these two plants are quite similar but the leaves are very different. It is notable that although *A. alpinus* is frequently rusted in Idaho, Colorado, Wyoming and in Scandinavia, where the plant is diploid ($2n = 16$), we have no record of its being infected in northern Canada where the population is at least largely tetraploid ($2n = 32$) (Mulligan and Porsild, Can. J. Bot. 47: 659, 1969). All available data indicate that *U. lapponicus* var. *lapponicus* and *U. phacae-frigidae* have no hosts in common, the erroneous conclusion in the footnote by Arthur (Manual, p. 303) having resulted from misdetermined specimens of *Oxytropis maydelliana*.

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