

**III. Axils closed; Not Cupforming; Sorediate or Not;  
Macropus**

1. Podetia and squamules K; lacking atranorin; podetia squamulose or verruculose, scarcely sorediate. .... 2  
1. Podetia and squamules K+ yellow, containing atranorin; podetia abundantly sorediategranulose. .... 3

2. Thallus [i.e., primary?] squamules larger; podetia with thick cortex, esorediate, with peltate squamules; P+ yellow; containing psoromic acid. Primary squamules persistent, 38 mm long and wide, irregularly lobed, crenate or entire or lobateincised, concave or involute; upper surface glacescent or rarely olive green; underside white or darkening toward base; esorediate. Podetia 1060 mm tall, to 5 mm diam. but usually less, cylindrical, cupless, commonly tipped with apothecia; fertile podetia thickening, with fewer branches than sterile ones; sterile ones blunt or subulate; sides  $\pm$  fissured, esorediate to verruculose, granulose above but not sorediate; cortex areolate to verruculose; squamules usually dispersed and to 1 mm broad; decorticate part of podetium opaque, ashy to pale brown; verrucules and squamules glaucescent to olivegreen or brownish green; branches widely spreading. Apothecia brown, confluent or conglomerate or fissuredlobate, sometimes with squamules among the disks. Pycnidia on apices and sides of disks. K, KC, P+ yellow, with psoromic acid and unknown. On soils high in humus and on rocks with soil cover, BorealArctic, Alaska to Greenland, S to southeast Canada and New York. [Note: Stenroos, 1988 places this under Helopodium; see under that group]. .... C. macrophylla (Schaerer) Stenham.

2. Thallus squamules smaller; podetia with thin cortex and dispersed verruculae, becoming sorediate; podetial squamules not peltate; P; containing perlatoric acid. Primary squamules usually persistent, small, to 4 mm by 2 mm, irregularly or palmately divided, crenate, usually becoming concave; upper surface glaucescent or olive green or whitish glaucescent; underside white, darkening toward the base; esorediate or sparingly granulose. Podetia 14 cm tall, to 2.5 mm diam., cylindrical, cupless, simple or slightly branched, dichotomous to trichotomous; fertile tips dilated; sterile ones blunt or subulate; sides entire or fissured, sparingly granulose sorediate; cortex verruculose; verruculae partly developing into small squamules; upper part of podetium with reflexed, squarrose squamules similar to those of primary thallus, the lower part becoming entirely squamulose; parts between squamules

decorticate, dull and not translucent, white or ashy or olive glaucescent. Apothecia midsized to large or often small, confluent or lobate fissured, dark brown or reddish brown. K, KC, P, with perlatolic acid. On soils (sandy or rich in humus). Boreal Arctic, south to British Columbia and Colorado in the west, to Great Lakes area and northeasternmost U.S. in the east. .... C. decorticata (Flörke) Sprengel

**3. K+ persistent yellow, P+ yellow, containing psoromic acid.**

Primary squamules persistent, small to large, to 10(17) mm long and 2(5) mm wide, subwedge shaped, sinuate edged to crenate, narrowly lobed, becoming involute concave, ascending; upper side glaucescent; underside white; esorediate or sparsely granulose = sorediate on the margins and underside. Podetia 15-45 mm tall, to 3 mm diam., cylindrical, cupless, simple or toward the apices irregularly or fastigately branched; sterile branches blunt; fertile ones becoming dilated; sides becoming entirely decorticate or the base verruculose areolate; soredia granulose or subfarinose; partly or widely squamulose at base; squamules as narrowly lobed as the primary ones, commonly involute; surface dull, not transparent; decorticate areas chalky white; granules and verrucules ashy or whitish glaucescent. Apothecia small to midsized, to 3 mm broad, commonly perforate or lobate, or conglomerate, bulging over the edge of the podetia, dark brown red or reddish. KC, K+ yellow, with atranorin. On earth rich in humus, on sandy soils, and on thin soil over rocks, occasionally also on rotten wood. Arctic boreal, Alaska to Greenland, S to Connecticut, Wisconsin, Nebraska and Colorado. .... C. acuminata var. norrlinii

**3. K+ yellow then orange or red, P+ yellow, containing**

**norstictic acid.** Primary squamules persistent, to 7 mm long and 3 mm broad, narrowly elongate, sinuate edged, becoming crenate, involute concave; upper side glaucescent; underside white; margins and underside sometimes becoming granulose sorediate. Podetia 25 cm tall, to 2.5 mm diam., cylindrical, cupless, simple or the upper part branching irregularly or subfastigately; sterile apices blunt; fertile ones becoming dilated upwards; sides becoming chinky and sulcate, or subcontinuous corticate, sparsely granulose sorediate or esorediate, verruculose areolate or becoming decorticate, densely or loosely covered with squamules; matt, not transparent where decorticate; decorticate part chalky white; granules and verrucules whitish to glaucescent. Apothecia reddish brown, large, commonly perforate or sublobate. Containing atranorin. On soil rich in humus Arctic (Alaska to Iceland), southward to the northeastern U.S. .... C. acuminata

(Ach.) Norrl. var. acuminata