

Short Communication

***Hectorella*: A Member of the Betalain-Suborder
Chenopodiineae of the Order *Centrospermae***

By

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Abstract: Roots of *Hectorella caespitosa* HOOK. f. were induced to produce a red pigment which was shown to be a betalain and not an anthocyanin. These data indicate that *Hectorella* belongs to the *Chenopodiineae*, the betalain suborder of the *Centrospermae*, and excludes alignment with the anthocyanin family the *Caryophyllaceae*.

The monotypic genus *Hectorella* HOOK. f., an alpine cushion plant endemic to New Zealand, has been assigned within the *Centrospermae* to the betalain family *Portulacaceae* (BENTHAM & HOOKER 1865, PAX 1889) and the anthocyanin family *Caryophyllaceae* (DIELS 1896, PAX & HOFFMAN 1934, ECKHARDT 1964); HUTCHINSON (1969) even allied it with a glucosinolate family, the *Cruciferae*. In 1961, PHILIPSON & SKIPWORTH treated the taxon as the family *Hectorellaceae*. Recently, NG & al. (1975) chemically examined *Hectorella caespitosa* HOOK. f. but did not detect either betalains or anthocyanins; however, on the basis of all the morphological data, including those of SKIPWORTH (1961), they placed the taxon firmly in the *Centrospermae*. Later, BEHNKE (1975) reported that the plastids in the sieve-elements of this species contained a ringlike bundle of protein filaments typical of all centrospermous plants (BEHNKE 1976, 1977a); the plastids also contained a globular-type central protein crystalloid. These ultrastructural results not only confirmed that *Hectorella* belongs to the *Centrospermae* but also suggest that it is not a member of the *Caryophyllaceae*, whose members all show a polygonal-type central crystalloid. In addition,

BEHNKE (1977b) found the exine-sculpturing (supratectate spinulae and an anulopunctate tectum) of pollen from *H. caespitosa* to be typical of that previously reported for many members of the *Centrospermae* (NOWICKE 1975).

Since *Hectorella* does not normally produce either betalains or anthocyanins, it has not been possible to determine whether this centrospermous taxon belongs to the betalain-suborder *Chenopodiineae* or to the anthocyanin-suborder *Caryophyllineae* (MABRY 1976, 1977). However, one of us (W. R. P.) successfully induced the development of red pigmentation in root tissue of *Hectorella caespitosa*. Individual shoots were separated from the compact cushions and suspended in glass tubes with their bases immersed in tap-water. When exposed to full light on a glasshouse bench long, unbranched roots developed which were reddish throughout their length. Examination of the root pigment by standard electrophoretic procedures (MABRY & al. 1975) clearly established that it was a betalain (Rf values similar to betanin) and not an anthocyanin. These chemical data establish *Hectorella* as a member of the betalain-suborder *Chenopodiineae* within the *Centrospermae* and decisively exclude alignment with the anthocyanin-containing *Caryophyllaceae*. Whether the taxon should be treated within the suborder *Chenopodiineae* as the independent family *Hectorellaceae*, or as a member of one of the core betalain families of this suborder such as the *Portulacaceae* is not resolved.

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