

## TRIBAL REVISIONS IN THE ASTERACEAE. V.

### THE RELATIONSHIP OF RIGIOPAPPUS

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A recent survey of a number of genera placed in the Helenieae revealed the presence of an Asterean type of anther in the genus Rigiopappus. The type of anther with elongate exothecial cells bearing series of lateral thickenings and with a flat narrow appendage has been described in connection with the genus Geissolepis (Robinson & Brettell, 1972). A review of literature indicates that the relationship of Rigiopappus has been suggested a number of times previously though not formally confirmed.

The genus Rigiopappus was described originally by Asa Gray (1865) and labelled as "Heleniearum". In the original description was one line of particular significance, "styli rami fl. herm. parte stigmatosa brevi glabra (more Asteroidearum)". Other authors including Hoffman (1894) followed Gray in placing the genus in the Helenieae. Blake (1937) described a new genus, Tracyina, which he related to Pentachaeta in the Astereae and which he compared with Rigiopappus. Still, in spite of many similarities, Blake gave no definite indication that he considered Rigiopappus a member of the Astereae. Raven & Kyhos (1961) suggested that Blake might have placed undue emphasis on the differences in pappus structure between Rigiopappus and Tracyina and at the same time they reported the chromosome number of Rigiopappus as  $n = 9$ . Raven and Kyhos mentioned that the chromosome number might favor some connection with the Astereae.

The present evidence regarding Rigiopappus shows that (1) the stamens are Asterean in all respects, (2) the style branch is Asterean with a glabrous inner surface but the appendage like that of Tracyina is longer and slenderer than usual for the tribe, (3) the chromosome number is one that is common in the Astereae and (4) the genus is very similar to known members of the Astereae.

Possible contrasting evidence is the character of the pappus. The long narrow thickened squamae have caused the species to be placed in the Helenieae where there are no close relatives. Actually, squamose pappus types are known elsewhere in the Astereae though they are not common. Cronquist (1955) cited the presence of a row of marginal receptacular bracts as in the Madiinae for which reason he placed the genus in the latter group. He did mention that D.D.Keck whose understanding of the Madiinae was well known, did not agree.



A few details of structure have been noted in the present study. The margins of the corolla lobes of Rigiopappus have a fringe of long slender cells that lie appressed between the lobes before they open. Such cells have also been seen in Pentachaeta aurea Nutt., but there are only the usual short papillae present in Tracyina. The setae on the achenes of all three genera are very similar but the tips of the setae of Rigiopappus are slightly broadened, especially on the setae on the upper half of the achene. The carpopodia are distinct in all three genera with many small quadrate cells. The carpopodia of Rigiopappus and Pentachaeta are larger while that of Tracyina has only about two rows of cells. Rigiopappus and Tracyina are closest to each other in the marked slender lateral innovations of the inflorescence and in the elongation of the achene.

The three genera, Rigiopappus, Tracyina and Pentachaeta, can be maintained easily on the basis of pappus and achene characters. Still, Shinnars (1946) has clearly pointed out the need to rely less on the superficial pappus differences that are common in the Astereae and to discover the basic underlying relationships.

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