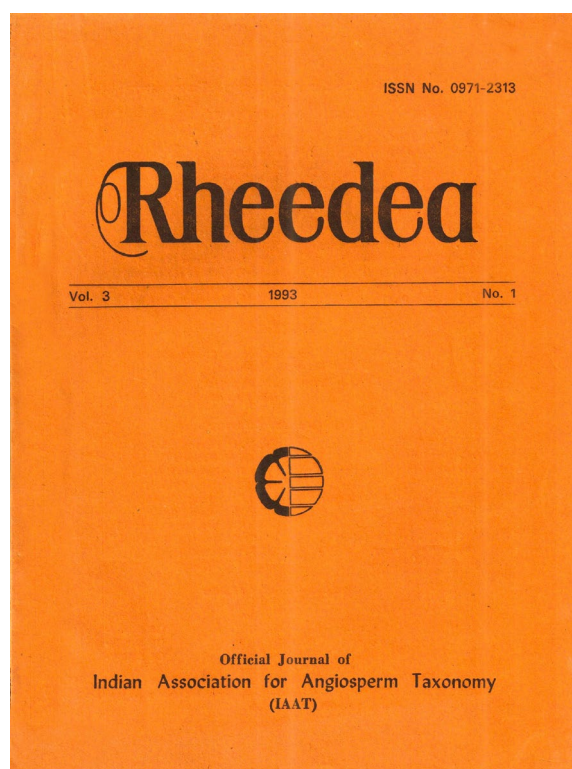




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**Dehiscent fruit of *Hydrocera triflora* (Linn.) Wt. & Arn.
(Balsaminaceae): Its anatomy and dispersal**

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Abstract

The anatomy and dispersal of the fruit of *Hydrocera triflora* has been investigated. The fruit wall does not show any histological differentiation characteristically exhibited by dehiscent fruits, but nevertheless, splits into five valves as a result of swelling of the mucilage containing cells of the pericarp. The present study supports the statement of Venkateswarlu and Dutt (1961) that the fruit is a capsular berry dehiscing septicidally.

INTRODUCTION

The monotypic *Hydrocera* Blume is of restricted distribution and extends from India to Java. Its flowers resemble those of *Impatiens* Linn. in essential morphological and anatomical features (Venkateswarlu and Dutt 1961; Narayana 1974; Rama Devi and Narayana 1989, 1990), but differs in the freedom of perianth parts, posterior sepal enclosing the upper margins of the anterolateral sepals, and independent origin of traces to the floral parts. *Hydrocera* is consequently regarded as more primitive than *Impatiens*. The earlier observations on the nature and dispersal of fruits of *Hydrocera* are conflicting and confusing (Venkateswarlu and Dutt 1961; Venkateswarlu and Lakshminarayana 1957; Narayana 1974; Cronquist 1981; Grey - Wilson 1980; Rama Devi and Narayana 1990). Critical observations on the type of fruit and its dispersal under natural conditions, presented in this paper, are based on a reinvestigation on the anatomy of the fruit and seed, of *Hydrocera triflora*.

MATERIALS AND METHODS

The material of *Hydrocera triflora* covering all the stages of flowering and fruiting were collected during field trips to Sarpavaram and Thimmapuram near Kakinada (A. P.) in India during October-November 1991, and fixed in FAA. Conventional methods of dehydration, infiltration and embedding were followed. Sections cut at a thickness of 8-12 microns were stained in crystal violet and erythrosin combination.

OBSERVATIONS

The present investigation amply confirms the earlier anatomical description

of the ovary and fruit (Rama Devi and Narayana 1990). The ripe fruits are purplish red and are highly mucilaginous. The number of cell layers constituting the fruit wall is the same as that of the ovary wall but the cells and the inter-cellular spaces become considerably larger. As a result of the breakdown of some of the cells, large air cavities are formed which help the fruit float in water. Neither the ovary wall nor the pericarp show cell alignment characteristic of dehiscent fruits. The ripe fruits, as could be observed in natural habitat of the plant, become detached from stalks, and freely float in water with the base upwards, indicating that the basal part is lighter than the apical part and are carried away by water currents. The detached fruits brought to the laboratory and transferred into a trough of water similarly floated. Water is imbibed by the mucilaginous cells of the pericarp through the region of abscission. Consequently the fruit wall swells up and starts splitting from base upwards along the radii of the septa, leaving the five seeds adhering to the placental tissue. About five hours later the dehiscent fruits settle down and ultimately the seeds, liberated from the placental tissue, sink and settle on the soil. Occasionally some fruits have been observed to dehisce from apex downwards. Very rarely some fruits were also seen to dehisce alternately from base and apex.

DISCUSSION

Although *Hydrocera* resembles *Impatiens* in essential floral anatomical features, it differs in some important characters such as freedom of perianth parts, 5-traced carpels with three ovules in each loculus suspended from a 3-lobed placentum. In *Impatiens* the fruit is a loculicidal capsule that dehisces from base upwards into valves that roll up elastically and explosively but the fruit of *Hydrocera* is a capsular berry dehiscing as described above.

The fruit of *Hydrocera* has been variously described as a drupe (Bentham and Hooker 1862-1893; Venkateswarlu and Lakshminarayana 1957; Gamble 1915), capsular berry (Venkateswarlu and Dutt 1961), 5-seeded indehiscent berry and a fleshy pseudoberry with pentagonal outline (Grey-Wilson 1980) and a berry-like drupe (Cronquist 1981). Very recently Rama Devi and Narayana (1990) made a detailed and critical study of the fruit wall and seed-coat and refuted the observations of earlier investigators and described the fruit of *Hydrocera* as a berry with five stony seeds. Due to the absence of morphological or anatomical evidence they ruled out the possibility of septicidal dehiscence of the fruit.

According to Grey-Wilson (1980) the fruits of *Hydrocera* sink on falling into water because of their weight and that the seeds are set free after the decay of the fruit wall. But the present study confirms the earlier findings of Rama Devi and Narayana (1990) who stated that the fruits float in water, the necessary buoyancy being provided by the large intercellular spaces in the pericarp.

The present study clearly reveals that the fruit wall in *Hydrocera*,

although does not show any histological differentiation characteristic of dehiscent fruits, does split along the septa into five valves as a result of swelling of the mucilage containing cells of the pericarp leaving the seeds attached to the placental tissue. It fully supports the view of Venkateswarlu and Dutt (1961) that the fruit is a septicidally dehiscing capsular berry. Cronquist's (1981) observation that the endocarp in *Hydrocera* separates into five one seeded pyrenes is incorrect as the fruit wall does not show any differentiation of the endocarp at any stage of development. The present study confirms the description of the seed structure as given by Rama Devi and Narayana (1990), and hence need no recapitulation here.

In conclusion it may be said that *Hydrocera* differs from *Impatiens* in not only fruit morphology and structure and development of seed coat but also in aquatic habitat, 3-flowered (rarely 4-flowered) inflorescence, freedom of perianth parts, independent origin of traces to the different floral parts, 5-traced carpels and three suspended ovules on the 3-lobed placentum in each loculus. In view of the resemblances to *impatiens* in essential floral morphological, floral anatomical, embryological and palynological characters, *Hydrocera* can reasonably be retained in Balsaminaceae under a separate tribe *Hydrocerae*.

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