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Research Communication

New Record of the four species of *Riccia* from Bankura district, West Bengal (India)

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Abstract

The present study reports four different species of *Riccia* from Bankura district of West Bengal, India. The species are not reported earlier in this area. Here, these species are characterized on the basis of morpho-taxonomy, anatomical characters and reproductive characters. All the species are monoecious.

Keywords

Riccia; liverwort; Bankura; India

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Introduction

Bryophytes are the oldest land plants in the Earth. Their tiny and delicate nature is sometimes overlooked. But they are powerful tools to conserve ecosystem, pollution indicator, food and nutrition (Rieley *et al.*, 1979) and much more.

The genus *Riccia* was recognized by Micheli (1729) in *Nova Plantarum Genera* in admiration of P.F. Ricci, an Italian Botanist. Since then approximately 200 species have been reported from different regions of the world (Perold, 1989) with predominance in Mediterranean climatic conditions. In India, the study regarding this genus was initiated by Griffith (1849), with the description of *Riccia* sp. (= *Riccia frostii* Austin) collected from the cache of river Brhmaputra (Assam). Subsequently numerous species of this genus have been described from various part of the country (Ahmad, 1942; Kachroo *et al.*, 1977; Udar, 1956, 1957, 1959; Pande and Udar 1957, 1958, 1959; Udar and Agarwal, 1985). Beside these, Currently, this commonly growing thaloid genus is represented by ca 38 species, of which eight species viz. *Riccia billarderi* Mont. & Nees, *R. crystallina* L. *R.*

ciliata Hoffm. *R. discolor* Lehm. & Lindenb., *R. frostii* Austin, *R. gangetica* Ahmad, *R. huebeneriana* Lindenb., *R. sorocarpa* Bischoff are well-known to occur in the State of West Bengal (Bhattacharyya, 2005; Bag *et al.*, 2007; Singh and Singh, 2007; Singh *et al.*, 2009). Dandotiya *et al.* (2011) also listed these species of *Riccia* in their checklist.

The district Bankura in West Bengal, India, has been described as the connecting link between the plains of Bengal on the east and Chotonagpur plateau towards the West. The district is situated between 22°38' and 23°38' North latitude and between 86°36' and 87°46' East longitude. The areas to the east and northeast are low lying alluvial plains and Western part of the district has hard beds of lateritic soil.

Materials and Methods

The materials are collected from Bankura district in the year of 2012-2013 between the months of November to December. Photography and workout were done from the fresh collected samples. The collected samples were fixed in FAA for further study.

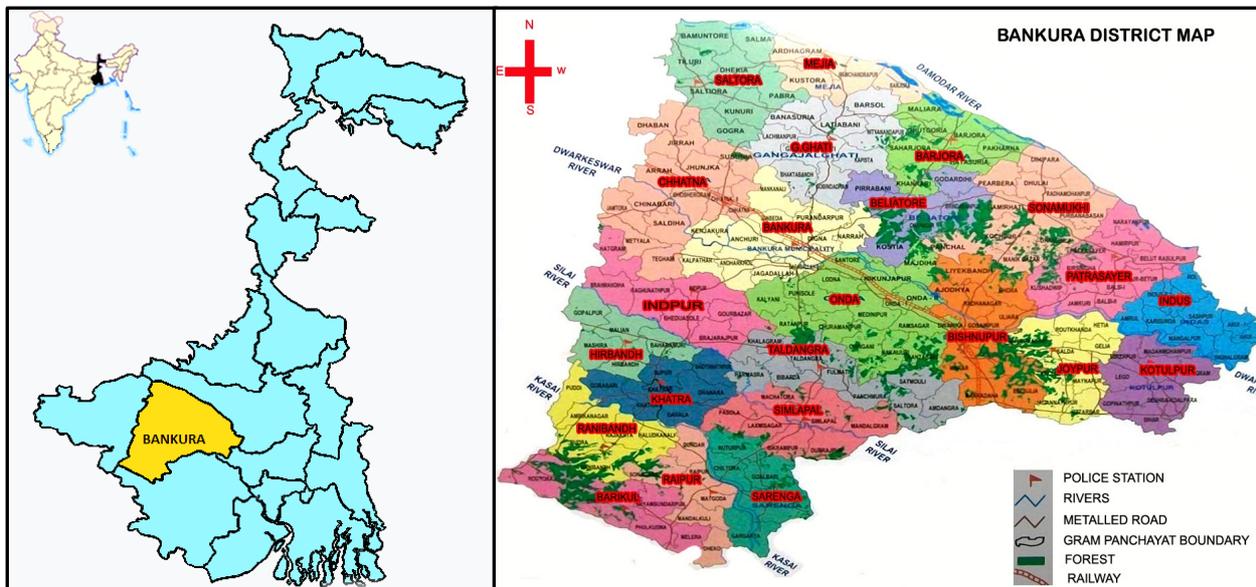


Fig 1. A map of India showing the state of West Bengal and Dist. Bankura

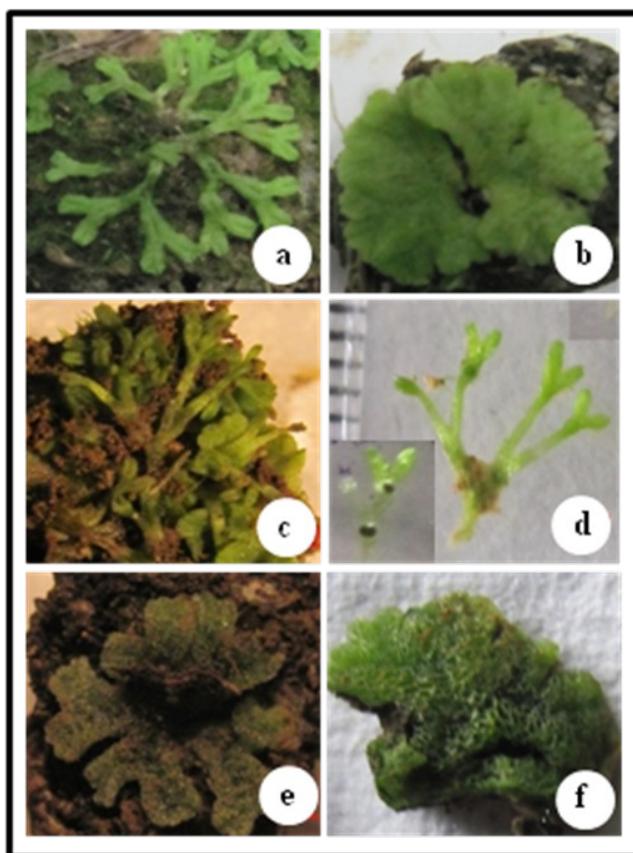


Fig 2. (a). *Riccia billardieri*; (b). *R. cruciata*; (c-d). *R. huebeneriana*; (e-f). *R. gangetica*. (Scale 1div=1mm)

Photography was done by Olympus Cannon 120 IS and Magnus. All the materials are deposited at the Department of Botany Herbarium, University of Burdwan.

Result and Discussion

Key to the four species collected is describe below

1. a. Rosette form of the thallus is compact..... *Riccia cruciata*
 - aa. Rosette form of the thallus is not compact2
2. b. Dorsal surface of the thallus with distinct velvety appearance.....*R. gangetica*
 - bb. Dorsal surface of the thallus without velvety appearance3
3. c. Thallus much narrower, 2-3 times furcate..... *R. huebeneriana*

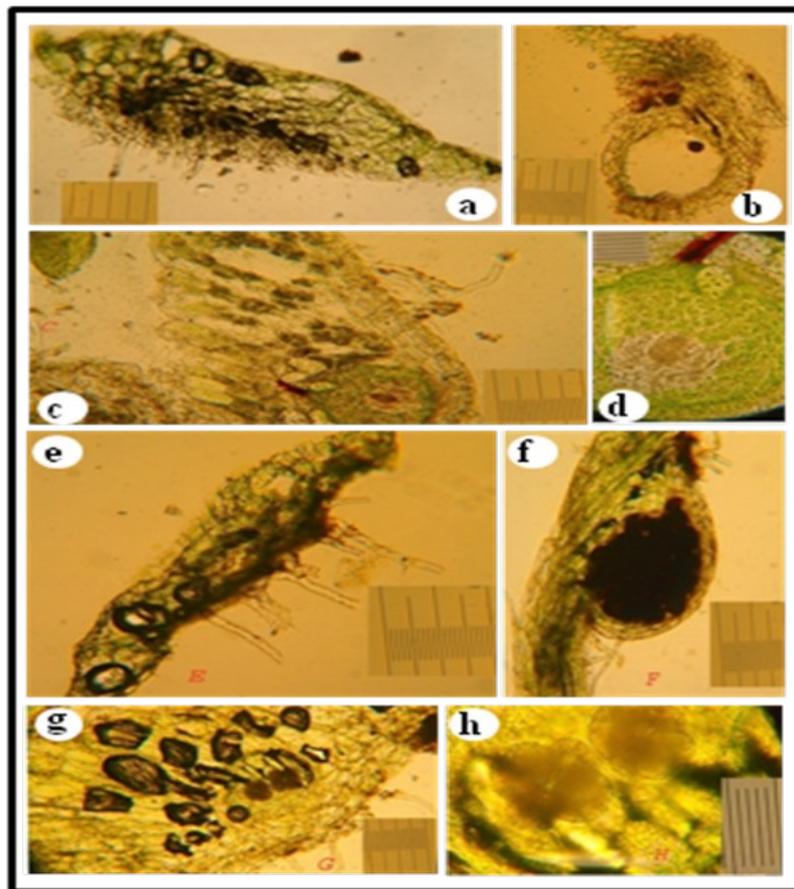


Fig 3. (a-b). *Riccia billardieri*; **(c-d).** *R. cruciata*; **(e-f).** *R. huebeneriana*; **(g-h).** *R. gangetica*. (Scale 1div=1mm).

cc. Thallus wider, 1-2 times furcate..... *R. billardieri*

Description of the taxa

[1] *Riccia billardieri* Mont.& Nees. (Fig. 2a; 3 a,b).

Plants deep green, dichotomously branched, 6-8 dichotomies forming typically rosette. Thallus 10-16 mm in diameter. Each dichotomy with 5-7 mm in length and 3-4 mm in width, single branch with 1-1.5 mm in width. Rosette form not compact. Dichotomy with 1-2 furcate. Apical notch distinct occasionally, margin undulate.

Cross section of the thallus with compact photosynthetic zone on the upper side and lower elaborated storage region without air space. Sporophytic structure i.e. capsule with distinct golden brown spore located on the ventral surface.

Specimens examined: Field No. PM- 09 & 17, Thallus growing on soft moist soil on the paddy field. Soil with good water holding capacity .Birsingha, Bankura 18.11.2012, 25.12.2013

Distribution: West Bengal, Uttaranchal. Assam. Panjab, Madhya Pradesh, Uttar Pradesh, Bihar, Maharashtra, Karnataka.

[2] *R. cruciata* Kashyap (Fig. 2b, 3c-d)

Plant light green to yellowish green, dichotomously branched 7-9 dichotomies forming rosette. Thallus 13-16 mm in diameter. Each dichotomy with 5-6 mm

in length and 4-5 mm in width. Single branch with 2 mm in width. Apex broad notch indistinct. Dorsal surface of the thallus showing distinct velvety appearance

Cross section of the thallus with upper photosynthetic zone showing distinct air canal and lower storage region . Presence of archegonium with distinct neck and developing Sporophyte on the lower side.

Specimens examined: Field No. PM - 11 & 18, Thallus growing on soft moist soil on the paddy field. Birsingha, Bankura 18.11.2012, 25.12.2013

Distribution: West Bengal, Sikkim, Assam, Meghalaya, Panjab, Uttar Pradesh, Rajasthan, Kerala.This species is second report from this state after Bag *et al.* (2007).

[3] *R. huebeneriana* Lindenb. (Fig. 2c-d, 3e-f)

Plants light green, dichotomously branched, 16- 18 dichotomies forming semi rosette. Thallus, 20-23 mm in diameter. Each dichotomy with 7-9 mm in length and 3-4 mm in width, single branch with 0.5-0.7 mm in width. Rosette form not compact. Dichotomy with 2-3 furcate thallus narrow linear ribbon like, slender Apical notch distinct, margin undulate.

Cross section of the thallus with photosynthetic zone on the upper side and lower storage region. Sporophytic structure i.e. capsule on the ventral

surface, 2-4 per thallus arranged in single row, dark brown, globose. Spores are deep brown.

Specimens examined: Field No. PM- 07 & 21 Thallus growing on soft moist soil on the paddy field. Birsingha, Bankura 18.11.2012, 25.12.2013

Distribution: West Bengal, Sikkim, Assam, Madhya Pradesh, Karnataka.

[4] *R. gangetica* Ahmad (Fig. 2e-f, 3g-h)

Plant deep green, dichotomously branched, 1-2 furcate, 6-8 dichotomies forming rosette. Thallus 7-9 mm in diameter. Each dichotomy with 3.5-4.5 mm in length and 4-5 mm in width. Single branch with 2 mm in width. Apex broad notch indistinct. Dorsal surface of the thallus showing distinct velvety appearance.

Cross section of the thallus with compact photosynthetic zone, epidermal cells. Lower compact multilayered storage region. Capsule prominent on the ventral surface with tetrad arrangement. Spores are brown.

Specimens examined: Field No. PM 14 & 23, Thallus growing on soft moist soil on the paddy field. Birsingha, Bankura 18.11.2012, 25.12.2013

Distribution: West Bengal, Himachal Pradesh, Uttaranchal, Meghalaya, Panjab, Uttar Pradesh, Madhya Pradesh, Rajasthan, Maharashtra, Tamil Nadu.

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