

# Occurrence of viviparous gametophytes from capsule of *Marchantia palmata* Nees. from Sikkim, India

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**Key-words**—*Marchantia palmata* Nees., viviparous gametophyte, Sikkim.

THE plant body of bryophytes are gametophytic in nature, bearing sex organs. Members of Marchantiales generally bear sex organs on special branches - antheridiophore and archegoniophore or carpocephalum. The carpocephalum bears pendant archegonia and sporogonia which are differentiated into foot, seta and capsule, capsule bears spores and elaters. Spores are shed by dehiscence of the capsule and falling on to a suitable substratum germinate to form a new gametophyte. But unusual viviparous gametophytes were found attached to the capsule in some carpocephala of *Marchantia palmata* Nees., which is described in the present report.

Materials preserved in the repository of the Department of Botany, University of Calcutta, bearing the number CU/SK/1 were collected from Gangtok, Sikkim in November, 2003.

Thalloid gametophytes of *Marchantia palmata* Nees. collected from Gangtok, Sikkim has been found to bear carpocephalum as it normally bears with pendant archegonia and sporogonia. Capsule contained well developed spores and elaters within. Viviparous gametophytes were found to occur within the capsule borne on the carpocephalum and attached to it (Figs. 1-8). These viviparous gametophytes resemble the normal thalli in bearing the usual scales and rhizoids (Figs. 2-3). In addition, most of these viviparous gametophytes were also found to bear the characteristics asexual propagating organ - the gemma cup containing gemma (Figs. 4, 5 & 7).

Tiwari (1929, 1935) and Khanna (1932) reported

that spores in Hepatics such as *Cyathodium* undergo resting period and then germinate to form gametophytes. *In situ* germination of spores enclosed within the capsule wall without any resting period has been observed in *Conocephalum*, *Dumortiera*, *Pellia*, *Dendroceros*, members of Jungermanniales and in some extant pteridophytes such as *Selaginella*, *Marsilea* and a few fossil members viz. *Lepidocarpon*, *Miadesmia* and *Stauropteris*. A third condition has been reported by Mehra and Kachroo (1957) in a few members of Marchantiaceae such as *Reboulia*, *Plagiochasma*, *Grimaldia* and *Asterella*. In these cases there is no resting period but their spores do not germinate within the capsule. Pant and Singh (1984) reported the production of gametophytes from carpocephalum and rhizoidal furrows in *Marchantia polymorpha* and *M. palmata*. However, in the present investigation gametophytes were found to occur within the capsule borne on the carpocephalum. Development of such gametophytes may be due to spore germination within the capsule prior to spore dispersal exhibiting *in situ* development of gametophyte, bearing the characteristic features of normal thallus (Fig. 9).

Vivipary is a common phenomenon in mangroves due to ecological adaptation to halophytic habitat. It is also found in some angiosperms as an alternative method of propagation. This condition is prevalent in some ferns to overcome the unfavourable environmental conditions (D'Rozario et al.2001). In *Marchantia palmata* Nees. such phenomenon is unusual and is probably an ecological adaptation to tide

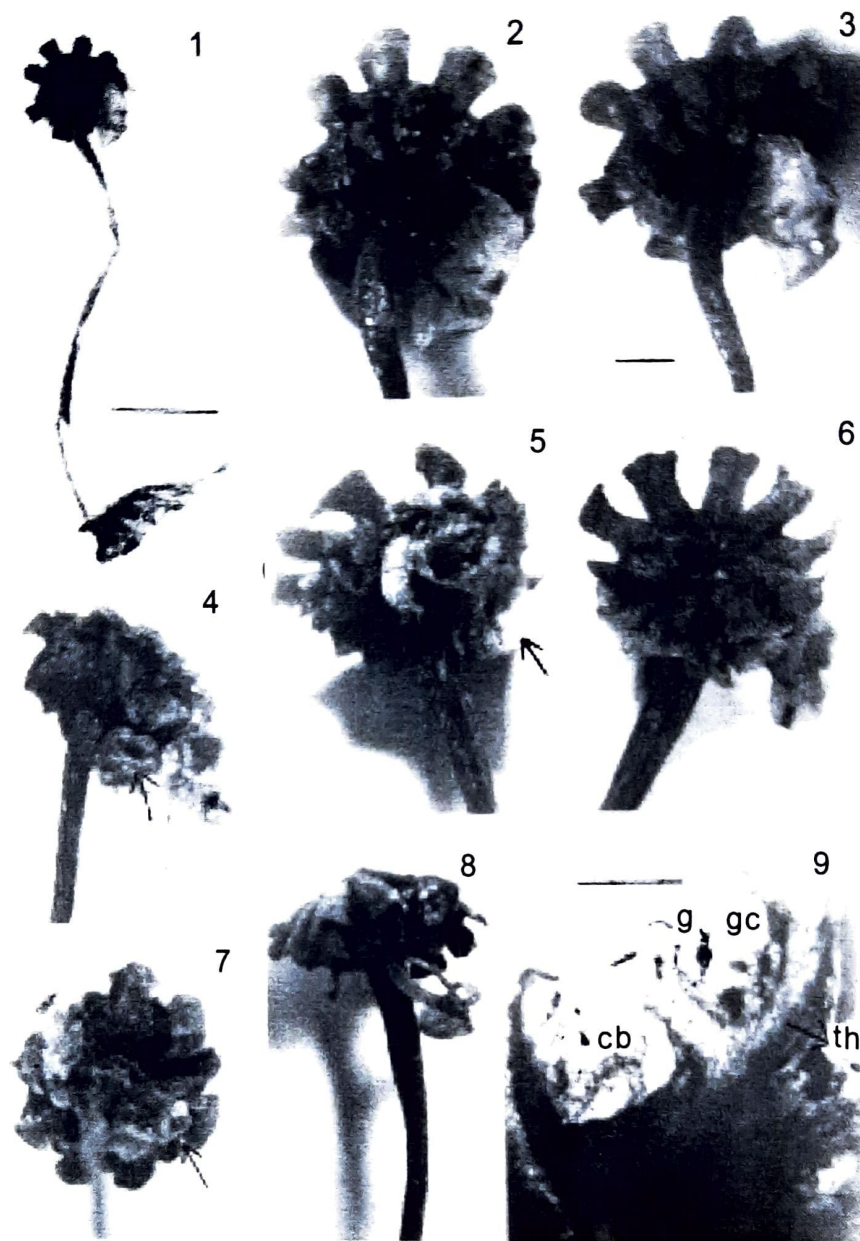


Fig. 1 Mature carpocephalum of *Marchantia palmata* showing young thallus coming out from the capsule base  
 Figs. 2, 3, 6, 8 Enlarged carpocephalum showing young thallus with scales and rhizoids attached to the capsule  
 Figs. 4, 5, 7 Carpocephalum with young thallus bearing gemma cup (arrow)  
 Fig. 9 L.S through in situ gametophyte (th) borne from capsule base (cb) and bearing gemma cup (gc) and gemma (g) within  
 (Fig. 1, bar = 5 mm; Fig. 2-8, bar = 1 mm; Fig. 9, bar = 1 mm)

over the cold and dry conditions during post monsoon period.

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