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The first report on the occurrence of pseudo-vivipary from *Pennisetum polystachion* (L.) Schult. (Poaceae) from India

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ABSTRACT

The development of root less plantlets in *Pennisetum polystachion* is a least common feature and reported only from Micronesica. There is only one herbarium collection of pseudo-viviparous *Pennisetum polystachion* from world made in the year 1980 by Fosberg and Sachet, Coll No. 59748 . The single herbarium specimen of the species with pseudo-vivipary is deposited in United States National Herbarium. Recently during the floristic survey some specimens of *Pennisetum* were collected that had proliferated, producing plantlets on the inflorescence. The present collection is first report on pseudo-vivipary on *Pennisetum polystachion* from India.

Key Words: *Pennisetum polystachion*, pseudo-vivipary, India.

INTRODUCTION

The genus *Pennisetum* (bristle grass) is one of important genera of the tribe *Paniceae,* and is widely distributed throughout the tropics (Schmelzer 1997). *Pennisetum* has been a difficult genus to classify, and taxa have been placed formerly under a variety of genera: *Penicillaria, Holcus, Panicum, Setaria* and *Cenchrus,* before they settled down in *Pennisetum.* Spikelet proliferation are reported in some polyploidy species of *Pennisetum* such as *P. polystachyon, P. subangustum* (tetraploid) and *P. setosumsam* (hexaploid). Milton *et al*. (2008) reported the occurrence of pseudo-vivipary from *P. setaceum*. However, the occurrence of pseudo-vivipary from *P. polystachyon* was reported by Fosberg & Sachet (1982) only from Micronesia (Fig.1). Nair and Pillai (1969) reported the bulbil formation for the first time, in hexaploid *P.polystachion.* They suggested that the bulbils develop by modification of the spikelets into vegetative buds. Except the literature of Nair & Pillai (1969) there is no any other report on the occurrence of pseudo-vivipary from *Pennisetum polystachion*. A single herbarium specimen of the species with pseudo-vivipary is deposited in United States National Herbarium (Fosberg, Coll No -59748, from DanDan volcanic areas of Guam, 6th June 1980). At the same time two more collection were also made from two different localities viz., Anae Island (Tsutsui 25) and another from anTrinian (Fosberg 59907). Some other collections were also made by by stone during 1968 from Sagua river area (Stone 4264), during 1965 two more collection were made by Fosberg from Ulithi area (464998 and 46499) from two separate clumps of the species with varied rate of spikelet proliferation. After that there is no any other literature or herbarium specimen of the species within this long gap of 44 years (1969-2013). Recently, during the floristic survey some specimens of *Pennisetum* were collected that had proliferated, producing plantlets on the inflorescence. The recent occurrence of the species with pseudo-vivipary ought to be a rediscovery.

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MATERIAL AND METHODS

In course of floristic survey on grasses of West Tripura some specimens of *Pennisetum* with viviparous germination were collected from Sinaikami, Champaknagar, West Tripura. On critical examinations, it is identified as *Pennisetum polystachion f viviparum* Fosberg and Sachet. The species was not collected by Deb (1983) or by Datta *et al*. (2008). Thus the present paper reports on the additions of *Pennisetum polystachion f viviparum* for the State of Tripura. In the present paper also provides a short description along with ecological note. The herbarium specimens collected and the voucher specimens are deposited in Tripura University Herbarium (TUH), Tripura, India. The world history of *Pennisetum polystachion f viviparum* collections from world are chronologically arranged in Table 1.

RESULTS AND DISCUSSION

Pennisetum polystachion (L.) Schult., Mant. 2:46. 1824. **Fig.2-4**

≡ *Panicum polystachion* L., Syst.Nat.ed. 10, 2:870. 1759.
= *Pennisetum setosum* (Sw.) Rich. in Presoon, Syn. Pl. 1:72. 1805.
= *Pennisetum polystachion f. viviparum* Fosberg & Sachet, *Miconesica*, 18:2.1982.

Short-lived perennial or annual. Culms much branched, 50–130 cm tall. Leaf blades linear, 10–16 × 0.3–1.2 cm, hispid. Inflorescence linear, 10–15 × 0.8–1.2 cm, yellow or purplish; axis angular with sharp decurrent wings below the involucres, these densely packed, often spreading at right angles at maturity; involucre with numerous bristles obscuring the single spikelet, densely ciliate in lower half with crinkled matted hairs, longest bristle 1–2 cm. Spikelet narrowly lanceolate, 3–4.5 mm; lower glume absent or a small triangular scale; upper glume as long as spikelet, 5-veined, obtuse, ciliolate, apiculate; lower floret staminate or neuter, lemma similar but slightly shorter, obtusely 3-lobed; upper floret 2/3 spikelet length, cartilaginous, smooth, shiny, readily deciduous at maturity; anthers without hairs at tip. At maturity the spikes modified bearing small plantlets beginning as leaf with sheath and blade, without any root notably pilose the blades have scabrous margins. The main characteristic of these spikelets is that they are sterile and the proliferations develop without seed formation.

Material examined: Bhowmik and Datta, 111. Sinaikami, 2013. GPS location N 23° 49′ 36.1″ E 091° 31 ′10.6″ Altitude 109 m.

Table 1: Chronological collection of *Pennisetum polystachion f viviparum* from World

Collection made by	Collection locality	Collection No
Fosberg	Dan Dan, Guam	59748
Fosberg	Ulithi, Guam	46498
Fosberg	Ulithi,Guam	46499
Stone	Guam	4204
Tsutsui	Anae Island, Guam	25

The fact that the occurrence of vivipary in *Pennisetum polystachion* least common phenomenon (Fosberg & Sachet, 1982). The phenomenon is known from over 100 species of grasses (Poaceae) worldwide (Beetle 1980; Vega & Ruglo 2006). As in most other sedges and grasses, the *P. polystachion f viviparum* plantlets produced by pseudo-vivipary on inflorescences are rootless. Vegetative propagation through pseudo-vivipary (or spikelet proliferation) in grasses (Poaceae) can be caused by genetic factors, injury or unfavorable environmental conditions (Beetle 1980). Spikelet proliferation in plants which are not members of the viviparous races is not hereditary and occurs in the temperate zone when the day length is decreasing, or under greenhouse conditions, when there is insufficient vernalization (Schmelzer 1997). Milton *et al*. 2007 hypothesized that occurrence of pseudo-vivipary in *Pennisetum setaceum* is induced due to submergence. Our specimen is collected from Hilly tact so the hypothesis could not fit for the species. However, the specimen was collected during the month of July when local temperature is used to be highly humid in nature. So, might be humidity have certain effect on induction of vivipary. Arber (1934) states, vivipary is easiest to find on plants grown during the rainy season, which indicates a dependence on external conditions, but the fact that the proliferations occur only on plants of certain origins also indicates a hereditary characteristic

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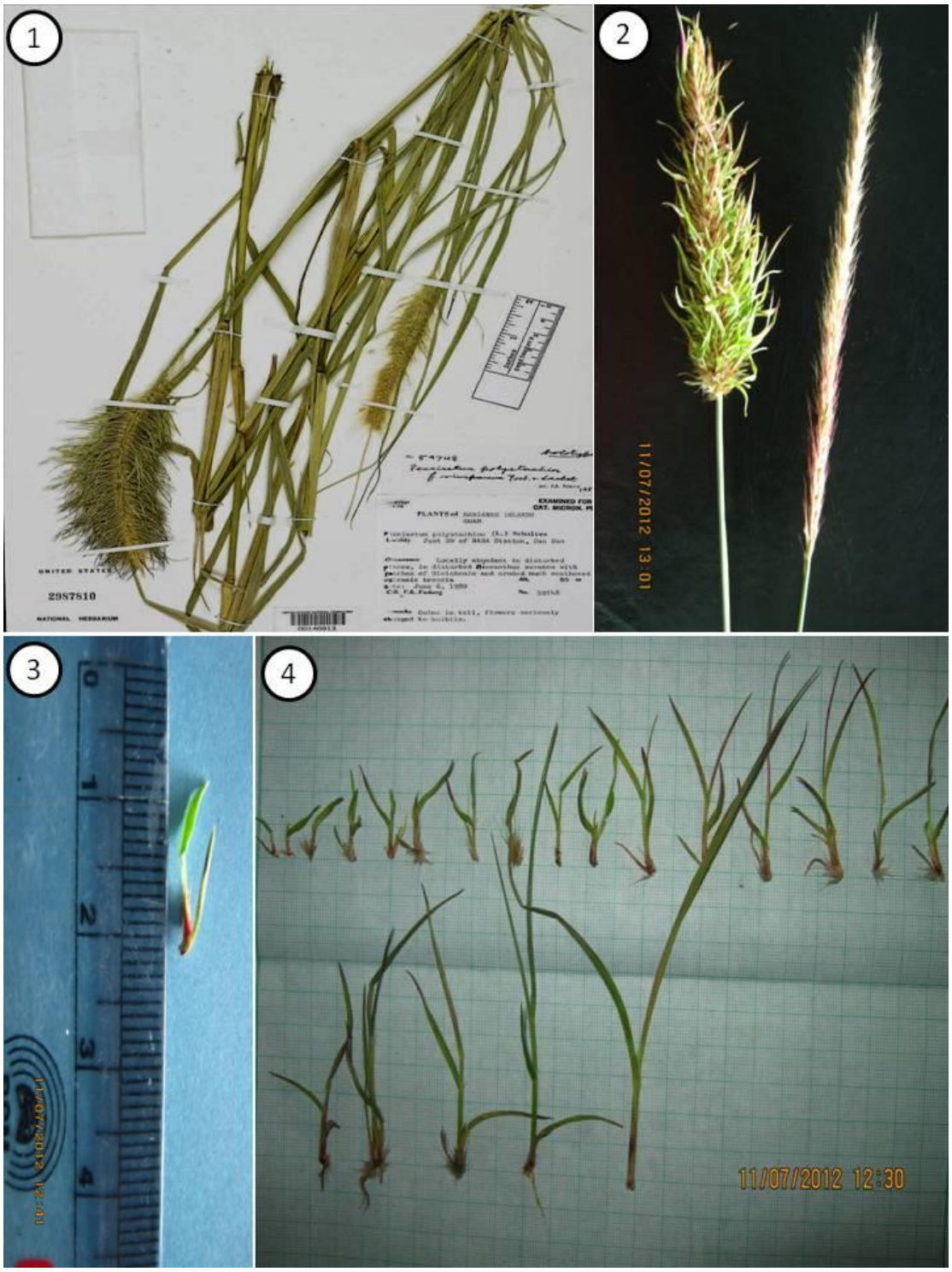

Figs 1-4: *Pennisetum polystachion* (Linnaeus) Schultes. **1)** Holotype of *Pennisetum polystachion f viviparum* Fosberg and Sachet; **2)** *Pennisetum polystachion* with viviparous spikelet and floral spikelet; **3)** Young viviparously developed plant; **4)** Different stages of growth of plantlets develop on spikelets of *Pennisetum polystachion* through viviparous mean.

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