



ORIGINAL RESEARCH ARTICLE

Hymenachne acutigluma (Steud.) Gilliland in GBS 20:314 - An exceptionally important perennial grass for anatomy and indigenous practice.

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Abstract: *Hymenachne acutigluma* (Steud.) Gilliland, a robust rhizomatous perennial grass spreads on moist and swampy land and also floating in water. Being a grass species, they do not have any cambium for secondary growth. A peculiarity in stem anatomy especially the spongy pith of secondary tissues found in absence of the cambium. The origin and development of the parenchymatous pith tissues has been investigated in the present study. Economically this spongy pith is of very much potent for its high absorbing and filtering capacity and also used as a good fodder.

Key words: *Hymenachne acutigluma* (Steud.) Gilliland; Peculiar stem anatomy, Economic potentiality.

Introduction

Generally, stem (culm) of members of Poaceae shows erect, prostrate or creeping habit, usually with cylindrical and fistular internodes and solid nodes. In some Species the internode is solid (*Zea*, *Sorghum*, *Saccharum*). The solidity of internode due to the presence of thick walled conjunctive tissues. In the present investigation in the Genus, *Hymenachne acutigluma*, the internode is solid but parenchymatous. The parenchymatous pith is spongy and secondary in origin. So many workers (1-14) worked on this grass species since 1854 but such type of information has not yet been done until now.

Investigated Species:

Common name: Nal Khagra, Dhal grass.
Perennials aquatic or semi-aquatic grass (Fig-1&2), decumbent at the base and rooting at the lower nodes, upto 1.2 m high. Leaf-blades 10-40x 0.5-2.5 cm, linear, acute, glabrous, margins scabrid above, mouth ciliate; sheaths compressed, glabrous. Panicles upto 30 cm long, dense, narrow; rhachis robust, angular. Spikelet 5-5.5 mm long, pale green, awned; pedicels minute, slender, 1-3-nate, tips cupular. Lower glume 0.8-1.2 mm long, narrow, 1-3 nerved. Upper glume 5-5.5 mm long, lanceolate, scabrid on nerves. Lower lemma 3.5-4 mm long, awn upto 3 mm long. Upper lemma 3.5-4 mm long, ovate, acute, 2-nerved, scabrid above. Stamens 3, Anthers 0.7-1 mm long, yellow; caryopsis very small, oblong.

Fl. & Fr.: July- September.

Distribution: Myanmar, Malaya, Indo-China and Polynesia. India: Assam, Bihar, West Bengal, Orissa, Tamilnadu, Uttar Pradesh.

Ecology: This species prefers to grow in moist and swampy places.

Status: Wild, rare.

Specimens examined: De 2008, De 2284, De 2618, and De 2720.

Propagation: Generally, they are propagated by root stock or by cutting. The *Hymenachne acutigluma* is botanically identified as *Hymenachne acutigluma* (Steud.) Gilliland, Syn. *Hymenachne pseudointerrupta* C. Muell. Bor. (1940) described this grass as *Hymenachne amplexicaulis* (Rudge) Nees in Assam Flora 5,218. 1940). This grass is an American grass. But the Asian species is quite distinct and should be the *Hymenachne acutigluma* (Steud.) Gilliland, Syn. *Hymenachne pseudointerrupta* C. Muell.

This species is a robust rhizomatous perennial aquatic and semi aquatic grass. It is found to spreading on moist and swampy land or floating in water. *Hymenachne* is found to grow widely in South and Central America in swampy situation or river banks and seasonally flooded land (Bogdan, 1952). In India two species are found to grow and in West Bengal one species is found (Sur & Roy Choudhary, 2015.)

Materials and Methods

Specimen in this paper has been collected from different areas of Purba Medinipur district and Paschim Medinipur District during different seasons for studying its habit and habitat, flowering and fruiting period, ecological and economic importance. Economic importance of this species has been investigated through questionnaire method with the tribes (Santals, Lodha, and Oraon) of Purba and Paschim Medinipur districts of West Bengal. The correct author citation of the investigated specimen has been done following the recent reference. (15). For detail anatomical investigation of the internode of the grass species, the specimen has been collected

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at different times and different stages of growth and development. After collection the fresh specimen has been dissected and observed under the Microscope following the high resolution Phase Contrast Microscope.

Economic importance and Indigenous Practices: Economically this grass is a good fodder in rainy season and sold in the market as fodder. According to Hira *et al.*, (2002) this species contains the following feed ingredients: Dry matter (17.82 gm) Crude Protein Nx6.25 (12.3 gm.), Crude fibre (38.67 gm), Ether extract (3.45 gm.), Ash (16.63 gm.), Nitrogen free extract (28.90 gm.), organic matter (83.37 gm.)

Discussion

From anatomical studies it has been observed that, this aquatic grass species possesses hollow internodes in young condition like other grasses, but during maturity when they start to float on the surface of the water course, the parenchymatous secondary pith tissues starts to develop until and unless the whole central hollow space of the internode is filled up. The parenchymatous pith tissue is filled up with air and spongy in nature which adopt themselves for floating on the water surfaces (Fig- 3a, 3b, 4 & 5). The primary parenchymatous tissues towards the periphery of the internode behave as the secondary meristem, divide again and again and producing the secondary parenchymatous so called pith tissues which filled up the inner hollow space of the internode.

The spongy tissue of this grass species (Fig-3a& 3b) has very high absorbing and filtering capacity which is usually used in the following cases indigenously:

- As a wick of lamp where mustard oil is used as fuel (Fig-6a & 6b).
- In Band- Aid, the spongy tissue is used as an alternative of cotton for its high absorbing capacity.
- It can absorb ink-drop from a paper as like as blotting paper and easily this absorbed ink can be washed away just by rinsing in water.
- As a decorative material by coloring them in different colors
- As a filter in cigarettes and also in Biri (made of tobacco leaf wrapped by Kendu leaf) [Though generally in Biri, there is no filter system, but to use it in Biri, it will be better one for health]
- Besides the economic importance of the grass species mainly as fodder, the spongy pith tissues would be helpful for making small scale industries and can help to increase the socio-economic status specially development of women empowerment and for that

purpose their propagation should be increased in a large scale.



Figure 1:



Figure 2:



Figure 3(a):



Figure 3(b):

Figure 1(A plant body with inflorescence), Figure 2 (A plant body showing internodes), Figure 3 (a) & 3 (b) (spongy crock like tissues present within the internodes)

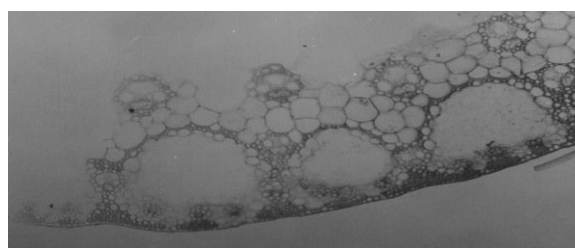


Figure 4:

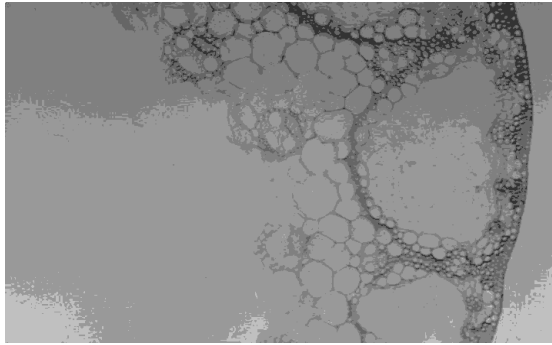


Figure 5:

Figure 4 & 5: (Anatomy of stem during the formation of spongy tissues showing the gradually filling of hollow internodes.)



Figure 6(a):

Figure 6(b):

Fig. - 6(a)& 6(b) As a wick of lamp where mustard oil is used as fuel

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