

# Seasonal Variation in Phenophases of *Mimosa pudica* (Fabaceae) In Grazed Pasture of Barandabhar Corridor Forest Chitwan, Nepal



Niroj Paudel\*

Division of Biological Resource Sciences, Kangwon National University, South Korea

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\*Corresponding author: Niroj Paudel, Division of Biological Resource Sciences, Kangwon National University, Chuncheon, 24341, South Korea, Email: nirojirauna@gmail.com

## Abstract

The Barandabhar forest covers an area of 87.9km<sup>2</sup> and bisects the Chitwan District in east and west. Phenophase is described in case of seasonal variation. The plant became grazed the study site- the pasture of Barandabhar corridor forest was marked into three zones, and the phenological behavior of *Mimosa pudica*. The present study will be valuable in evaluation and management of the pastures of land in Barandabhar Corridor forest in Chitwan, Nepal.

**Keywords:** Barandabhar; Chitwan; Grazed; Nepal; Phenology

## Introduction

The Barandabhar forest covers an area of 87.9km<sup>2</sup> and bisects the Chitwan District in east and west Chitwan. Barandabhar, a 29km long forest patch, is bisected by the Mahendra Highway, resulting in a 56.9km<sup>2</sup> area in the buffer zone. The flora of Barandabhar forest is dominated mainly by sal forest and partly by riverine, tall grassland and short grassland, the forest has range of climate season's winter, spring and monsoon with subtropical climate. *Mimosa pudica* is also called as shy plant, sleepy plant. Touch-me-not plant in local language. Jha [1] studied the growth form and phenology of the herbaceous vegetation in a grazed pasture at Biratnagar. He observed that the entire dominant grasses (*Axonopus compressus*, *Brachiaria distachya*, *Chrysopogon aciculatus*, *Cynodon dactylon*) and legumes (*Alysicarpus vaginalis*, *Desmodium triflorum*) of the said pasture had prostrate growth form. The early summer showers in March triggered the growth of new shoots and leaves from the subsurface perennating buds in all the dominant species, and all of them had active growth phase till August- September. He further observed sporadic seedling emergence in March, flowering between September-March, and seed maturation and dispersal from November to May in all the dominant legumes of the said pasture.

Earlier studies conducted by the Kenly Earth Science (Canada) (Anonymous 1986) have reported 0.64 to 1.22% organic carbon, 10.3:1 to 12.1:1 C/N ratio, 0.09 to 0.14% nitrogen, and 0.0003 to 0.0006% phosphorus in the farm soils

of Biratnagar, Nepal. Jha [2] studied seasonal variations in pH, nitrogen, phosphorus, potassium and organic carbon in the soils of a grazed pasture of Biratnagar and recorded 4.6 (September) to 5.7 (January) pH, 0.096 (September) to 0.185% (May) nitrogen, 0.027 (September) to 0.073% potassium (January), 0.004 (September) to 0.005% phosphorus (January and May), 1.34 (September) to 3.35% organic carbon (May), and 13.96:1 (September) to 15.22:1 (May) C/N ratio.

Mandal [3] reported the range of crude proteins between 6.8 to 15.6% in the shoots of some tropical grasses of eastern Nepal. Joshi et al. [4-5] found the highest concentration of nitrogen followed by potassium, calcium, phosphorus, and magnesium at vegetative stage in the standing crop of certain grasses and forbs of Garhwal Himalaya. Dhaubhadel & Tiwari [6] estimated 10.2% crude proteins and 1.6% fat in an alpine pasture (3800m altitude) of Kaski district of Nepal. Bhattarai [7] reported 11.9% crude proteins and 14.1% total sugars, whereas [8] reported 15.6% crude proteins and 5.9% lipids in the shoots of six-month-old pot-cultured *Paspalum distichum* and *Alysicarpus vaginalis*.

## Material and Methods

The study site- the pasture of Barandabhar coordinotr forest was marked into three zones, and the phenological behavior of *Mimosa pudica* (30 individuals sampled randomly from the marked zones) such as germination, vegetative growth, flowering, fruiting, seed maturation, and leaf fall were carefully observed and recorded at weekly intervals. When a phenophase

was noticed in about 10% individuals under observation, the phenophase was considered to be initiated, and phenophase was considered to be in peak when it occurred in more than 80% individuals [9].

### Results

Although sporadic seed germination in *Mimosa pudica* occurred in March, most of the seeds germinated in the last week of June. Vegetative growth in *Mimosa Pudica* occurred between March and August. *Mimosa Pudica* flowered from August to April but flowering was in a peak in April- May, and October-November only. Fruiting in the plant occurred from October to May, whereas seed maturation was observed between Novembers to May. Leaf fall in *Mimosa Pudica* occurred mainly between November-December.

### Discussion

The pH of the pasture soil harboring *Mimosa pudica* population was acidic (pH 5.8 -6.1). It may not have adverse effects on *mimosa pudica* as many tropical grasses and herbaceous are tolerant to low pH [10]. The organic carbon in the pasture soils (2.2- 3.6%) in the present study was much higher than the farm soils (0.84 to 1.29%) of Barandabhar (Anonymous 1986). It may be due to the fact that in continuous cropping systems there is a steady depletion of organic carbon whereas under pasture a higher equilibrium content of soil carbon is maintained which is in balance with gains from net primary production and losses from decomposition. Further, on the annual basis, the concentration of nitrogen, phosphorus and potassium in the pasture soil were lower than that of typical tropical grassland (N 0.26%, P 0.03% and K 0.11%) [11]. Medina [12] suggested that the reason for the low representation of legumes in tropical American savanna might result from the low levels of soil phosphorus which hinder the formation of N-fixing symbiosis with soil Rhizobium strains. Paudel, et al. [13] found the midland pasture in Nepal. This result is also supported [13]. Valuable evolution and management of land pastures in Barandabhar corridor forest.

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