Short Communication

Proficient physiognomies and herbage of blue panic grass (*Panicum Antidotale*) at variable clipping intensities

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ABSTRACT

Pakistan is an agriculture based country and a major portion of it falls under rangelands. Presently these rangelands are desecrated continuously because of high human impact. Contemporary necessity is to restore the forage potential by enhancing the efficacy of forage species in rangelands. A study on Blue panic grass (*Panicum antidotale* Retz.) was conducted. Stubbles of this grass was grown at NARC, Pakistan. Four clipping stages i.e. D1, D2, D3 and D4 (clipped after 20, 40, 60 and 80 days, respectively) were studied. The response variables were morphological characters (plant height, tiller density and herbage yield) of Blue panic grass. With the increase in clipping stage the plant height and number of tillers in the grass increased (P<0.05). Herbage yield significantly differed (P<0.05) at each clipping stage. With advancing plant maturity of the species, its herbage yield increased (P<0.05). Phonologically, with increasing plant maturity, proportion of its plants with vegetative stage declined. This decline of plants with vegetative stage can cause distraction to livestock depending on the species for grazing purposes. It is suggested that two months of clipping stage should be applied on Blue panic grass for getting sustained grass vigor and optimum herbage yield.

Keywords: Blue panic, clipping stage, maturity, morphological characters, herbage yield.

INTRODUCTION

Pakistan is an agricultural country and about two third area of the country is under rangelands. The rangelands in the country are important natural resources that heavily support livestock and wildlife population. Over-utilization and mismanagement of these rangeland resources have severely deteriorated potential for forage production. Currently these rangelands are overexploited constantly because of high human impact. Contemporary necessity is to restore the forage potential by enhancing the efficacy of forage species in rangelands.

Blue panic grass (*Panicum antidotale* Retz.) belongs to Poaceae family of plants and is locally called as "Malai" grass. It is resistant to drought and requires 500-800mm annual precipitation and at an elevation of up to 1000 m (Quraishi et al., 1993). Its rapid growth produced large quantities of palatable but rather coarse herbage in good growing conditions. This grass is self-defensive and can withstand heavy grazing. Natural reseeding by Blue panic increases the rangeland productivity 12 times in northern area of Pakistan (Quraishi et al., 1993). In Kohistan ranges, Blue panic yields the second largest forage after Buffel grass. This grass is quite suited for large scale seeding on Murree foothills, Pothowar Plateau, Thal and Kohistan ranges (Quraishi et al., 1993). *P. antidotale* is a...
Table 1. Physiognomic characteristics of *Panicum antidotale*

<table>
<thead>
<tr>
<th>PHYSIOGNOMIC CHARACTERISTIC</th>
<th>PANICUM ANTIDOTALE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ligule</td>
<td>Membranous</td>
</tr>
<tr>
<td>Auricles</td>
<td>Short stubby</td>
</tr>
<tr>
<td>Collar</td>
<td>Continuous</td>
</tr>
<tr>
<td>Leaf Bud</td>
<td>Rolled</td>
</tr>
<tr>
<td>Leaf Blade</td>
<td>Present</td>
</tr>
<tr>
<td>Mid Rib</td>
<td>Parallel</td>
</tr>
<tr>
<td>Leaf Sheath</td>
<td>Present</td>
</tr>
<tr>
<td>Node</td>
<td>Prominent</td>
</tr>
<tr>
<td>Internodes</td>
<td>Present</td>
</tr>
<tr>
<td>Culm</td>
<td>Present</td>
</tr>
<tr>
<td>Rhizome</td>
<td>Absent</td>
</tr>
<tr>
<td>Stolon</td>
<td>Absent</td>
</tr>
<tr>
<td>New Tillers</td>
<td>Absent</td>
</tr>
<tr>
<td>INFLORESENCE</td>
<td>Present</td>
</tr>
<tr>
<td>Inflorescence length (cm)</td>
<td>30</td>
</tr>
</tbody>
</table>

course, vigorous, leafy, much branched perennial grass spreading by short stout rhizomes or stolons. Leaves are linear and bluishgreen, leaf blades are 25-50 cm long and 5-12 mm wide. Flowering stems are up to two meters in height. It is now extensively grown from Arab, western countries and Australia in the east. It propagates through seed, stem cuttings and root suckers and is normally planted at a plant to plant distance of 50 cm. It could be allowed to graze or clip off for hay before flowering (Quraishi et al., 2003).

Insufficient information is available regarding variation in its physiognomies and forage yield with respect to clipping stages. Therefore, it is a requisite to clarify the effects of defoliation on this species. The objectives of this study were to determine the effect of clipping stage on its morphological characters and herbage yield.

**MATERIALS AND METHODS**

A study site at the research area of Range Land Research Institute, NARC, Islamabad was selected. Plot size was 17 x 14 m. This main plot was subdivided into 12 blocks. Each block was further divided into 3 replications and each replication contains 12 plants. Four clipping intensities i.e. clipping at 0 cm (maximum possible depth at which clipping was possible) above ground level (T1) 05 cm, (T2) 10 cm and (T3) 15 cm (T4) were studied. Similarly clipping frequencies were 20, 40, 60 and 80 days, respectively, after clipping. Mean daily minimum temperature ranged from 15 to 31°C while corresponding maximum temperature was 32°C to 48°C. Total precipitation recorded was 300 mm. More than 75% of the precipitation was recorded during the monsoon season. Calculation of no. of tillers was performed by randomly selecting three plants from each replication then the no. of tillers were manually counted and for remaining ones extrapolation from these selected plants was considered. Plant height (cm) was measured from to the end of the tallest leaf. Six plants from each experimental plot were taken and the data for whole plot as estimated, for the morphological traits, from the sampled data. Detail of physiognomies is explained in following table. For examining every physiognomic character the respective part (Root, Shoot or Stem) was examined by using hand lenses/magnifying glass and compound microscope.

Data was analyzed using Statistics 8.1 software. Two factor factorial designs under completely randomized block design were used. The data collected for different parameters were statistically analyzed using analysis of variance and comparison of means was done by Duncan’s Multiple Range test (Palaniswamy and Palaniswamy, 2006).

**RESULTS AND DISCUSSION**

**Physiognomic characteristics of *Panicum antidotale***

Following physiognomic characters of the species were observed as shown in Table 1.

**Plant height**

Mean plant heights of *P. antidotale* before monsoon were observed 91.444, 68.500 and 84.139 cm at 20, 40 and 60 days interval, respectively (Table 2). While after monsoon heights were measured 101.06, 71.86, 93.64, and 105.78 cm at the intervals of 20, 40, 60 and 80 days, respectively (Figure 1). Although, the plant height increased throughout the experimental period, the rate of increase was maximum during after monsoon. Plant height of the grass expanded (P<0.05) with expanding plant
development. Increase in plant height with progressing development might be recognized to longer vegetative development time of this grass with expanded phase of defoliation. Comparative results were accounted for by Butt et al. (1992), Mislevy et al. (1989) and Garcia and Rodriguez (1980). Plants of Buffel grass defoliated at the end of developing season delivered taller plants than those cut at 3, 6 and 9 weeks in the early planting (Butt et al., 1992). These taller plants were attributed to longer vegetative development period. Additionally, normal plant height of elephant grass increased from 1.2 to 4.9 m with expanding cutting stage (Mislevy et al., 1989). Garcia and Rodriguez (1980) reported that plant tallness of Buffel grass expanded with progressing age and the most astonishing normal height (96.7 cm) was recorded when it was cut following 84 days while the least normal height (51.3 cm) was recorded when it was cut after 42 days.

**No of tillers per plant**

Before monsoon average number of tillers per plant of Bluepanic grass at interval days of 20, 40, and 60 were 123.36, 56.61 and 52.83, respectively, while the data for 80 days is absent in this study because of the reason of onset of monsoon season (Table 3). The tiller density was highest (123.36) at 20 days and it declined gradually to the minimum (52.83) at 60 days. Maximum tillers per plant of this grass at 20 days were due to more vegetative growth of the plants (Figure 2). The tillers density decreased (P<0.05) with advancing plant maturity of the grass. Decreased tillers per plant of this grass with advancing growth can be attributed to its morphological character and due to hot weather. After monsoon the no. of tillers at 20 days interval were 116.0, at 40 days interval it was 81.44, 60 days interval showed 53.33 and 80 days interval were 59.63.

*P. antidotea* had characteristic of branching through which it enhanced its foliage (Gohl, 1981). After clipping, the tillers emerged adequately and subsequent expansion of plant was through branching. These findings differed with those of Madakadze et al. (1999) who reported that tiller density increased with increasing plant age and caused increased dry matter yields. Similarly, Butt et al. (1992) also reported that tiller density increased in Buffel grass with advancing grass age. The results of this study are however consistent with those of Mislevy et al. (1997) who determined the influence of plant height of *Erianthus arundinaceum* on number of tillers and reported that percentage of total and live tillers declined, while that of dead tillers enhanced quadratically as plant height increased from 0.6 to 4.3 m. Decreased number of tillers per plant may also be due to self-shade effect of mature plants. High light intensities enhanced tillering and as plant grew larger and denser, it became increasingly self-shaded and resulted in reduced number of tillers (Homes, 1989).
CONCLUSION

It was assessed from the above discussion that morphological characters of *P. antidotale* like its plant height and no. of tillers increased with advancing plant maturity if there occurs proper soil moisture and sufficient rainfall but in case of a drought the growth will definitely be affected. Although the grass had highest herbage biomass production at the 4th clipping stage but in this growth the proportion of plants with vegetative stage was lower than the height at the first 20 days of clipping stage of the species.

REFERENCES


