



A Comparative Seasonal Anatomical Analysis of Stem of *Cynodon dactylon* - A Herbal Plant

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ABSTRACT

Cynodon dactylon commonly known as Durva grass, Bermuda grass, Dog's tooth grass, Dhro, Lilidhro etc. *Cynodon* is one of the most common weeds in Bharat. *Cynodon* has many medicinal properties hence it is used as a medicinal plant in different medical systems. The medicine prepared from the medicinal plants is very useful to the health of human beings. The plant which is used to prepare medicines, it requires detailed identification study of the plant. Anatomical study provides correct identification of plants. In this paper, seasonal anatomical analysis of the stem of *Cynodon dactylon* has been studied in detail by Axio - scope. The plant parts were collected during winter, summer and monsoon season from the local area of Valsad city, Gujarat, Bharat. This analysis concluded that different seasons did not affect the anatomical characters of the stem of *Cynodon dactylon*

Keywords: *Cynodon dactylon*, stem, anatomical analysis, seasonal analysis, Axio - scope.

INTRODUCTION

Cynodon dactylon (L) is known as the second most significant weed in the world after *Cyperus rotundus*, a position over by its occurrence in every tropical and subtropical area. It has good drought endurance capacity because of a deep root system [1]. Roots may grow upto 15 to 20 cm deep in the soil. *Cynodon dactylon* is a stoloniferous, perennial grass with rhizomes. Rhizomes may grow 25 cm deep in the land. Leaves are open up at bottom, one to fifteen cm long depending on node, linear or lanceolate, glabrous. Flowers are formed through the year [2]. *Cynodon dactylon* a weedy grass belongs to a family Gramineae - Grass family [3]. Medicinal plants play a significant role in pharmaceutical companies in developing drugs from plants. *Cynodon dactylon* has great medicinal value and it is



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used in some household treatment and also in traditional medicine and it may be applied externally as well as internally also [4]. Fresh juice of plants used in diarrhoea and dysentery. Internally the plant is used in various diseases like epilepsy, hysteria, bleeding in piles, haematuria, and menorrhagia [5]. Decoction of the plant can be used for the treatment of kidney stones [6]. Ethanol extract of the aerial part shows CNS depressive activity in rats. Hydroalcoholic extraction of rhizomes shows improvement in cardiac functions in rats. Aqueous extract preventive against aluminium induced neurotoxicity and carbofuran induced oxidative stress [5]. Lord Rahu is pleased by this sacred grass in navagraha Homa. A negativity of the planet Rahu can be vanished by taking an extract of sacred grass (3 – 5 spoons) on a daily basis for 48 days. *Cynodon dactylon* (L) will absorb various radiation in the atmosphere. Ultraviolet rays from the sun and negative radiations emit at the situation of eclipse will be absorbed by this grass. That's why many Hindu families keep this sacred grass in residences at the situation of eclipse [7]. In this paper either seasonal variation occurs in stem anatomy of *Cynodon dactylon* plant or not is discussed.

MATERIALS AND METHODS

In various seasons like Winter, Summer, and Monsoon, the stems of *Cynodon dactylon* were collected from the local area of Valsad District in Gujarat, Bharat during winter in November, summer in March and monsoon in July. The taxonomically, authenticated and identified plant material by Dr. Ferzin M. Parabia, Bioscience department, with reference number "VNSGU/BVBRC/2020/12/TC-04". The specimens of voucher have been submitted at the VNSGU, Surat, Gujarat for future reference in the herbarium section. Mature and healthy plants with normal plant parts were collected and the required stem sample was cut and removed from the plant. The plant was washed in pure water to remove all the impurities. For the stem, a cylindrical portion of almost straight and sufficient length to hold the sample was selected. Enough number of free hand sections were taken. These sections were carefully transferred to a Petri-dish containing water using a fine painting brush for selection of good sections. Selected good sections were transferred to a Petri-dish containing Safranin stain. Sections were stained by safranin to confirm its lignification. After 2-3 minutes of staining, sections were transferred onto a slide, mounted in glycerol and then examined under a microscope. Photomicrographs were taken with Axio-scope – A1, ZEISS company, (Ocular: P1 - 10X* 23; Objective: 10X, 20X, 40X, 100X). Photomicrographs were taken with the help of an Axio-camera.

RESULT

Transverse section of the stem of *Cynodon dactylon* is oval in shape and reveals the existence of epidermis. *Cynodon* stem has one to two layered, sclerenchymatous epidermis. Which contain a square shape cell and a whole layer covered by thick cuticles. In the inner side of the epidermis three to five layered areas occur, that is the cortex. Cortex cells are parenchymatous and oval to round in shape and they bear starch grains. Innermost single layer of the cortex is endodermis. Pericycle is present on the inner side of the endodermis. It is two to five layered and made up of sclerenchymatous cells. Two layers of vascular bundle are present on the inner side of the pericycle and consist Y-shaped xylem and phloem. Vascular bundles are surrounded by one to three layers of sclerenchymatous cells. Conjoint, collateral and closed types of vascular bundle occur in the stem. Pith is the middle region of the stem and made up of parenchymatous cells. Pith cells have starch grain.

DISCUSSION

Cynodon dactylon is an important drug and used in various medications of Ayurveda and it is a well-known plant since Vedic period to the present epoch. Detailed anatomical study would mainly help in proper identification of plant material and wood [8]. It would also be used in implantation of genetic relationship and for detection of adulterants in crude drugs. In the present study, internal structure of the stem of *Cynodon* was performed in winter, summer and monsoon. Stem anatomy of *Cynodon dactylon* has two different layers of vascular bundle, each and





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every vascular bundle surrounded by 2 to 3 layers of sclerenchymatous cells. Parenchymatous cortex has starch grain. Pericycle was 2 to 5 layered and sclerenchymatous. The vascular bundles were conjoint, collateral and closed with 'Y' shape xylem.

CONCLUSION

This analysis concludes that different seasons did not affect the anatomy of the stem of *Cynodon dactylon*. Anatomical analysis could be used in identification of genuine plants and to know correct arrangements of cells in plants.

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Table 1: Details of studied plant sample

| S.No. | Taxa | Source | Plant parts used for anatomy | Parts medicinally used |
|-------|-------------------------|--------|------------------------------|------------------------|
| 1 | <i>Cynodon dactylon</i> | Valsad | Stem | Whole plant |

Table 2: Summary of comparative seasonal microscopical characters of stem of *C. dactylon*

| No. | Characters | <i>Cynodon dactylon</i> | | |
|-----|-----------------|-------------------------|---------------|---------------|
| | | Winter | Summer | Monsoon |
| 1 | Cuticle | Thick cuticle | Thick cuticle | Thick cuticle |
| 2 | Trichome | Absent | Absent | Absent |





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| | | | | |
|---|------------------------|---|---|---|
| 3 | Epidermis | 1 to 2 layered, made up of sclerenchymatous cells | 2 layered made up of sclerenchymatous cells | 1 to 2 layered, made up of sclerenchymatous cells |
| 4 | Cortex | 3 to 5 layered, oval or round or hexagonal shaped cell with starch grain | 3 to 5 layered, oval or round or hexagonal shaped cell with starch grain | 3 to 5 layered, oval or round or hexagonal shaped cell with starch grain |
| 5 | Endodermis | Single layered | Single layered | Single layered |
| 6 | Pericycle | 2 to 5 layered, made up of sclerenchymatous cell | 2 to 5 layered, made up of sclerenchymatous cell | 2 to 5 layered, made up of sclerenchymatous cell |
| 7 | Vascular tissue | 2 layers of vascular bundle, each vascular bundle covered by sclerenchymatous cell Vascular bundle – conjoint, collateral, closed with ‘Y’ shape xylem | 2 layers of vascular bundle, each vascular bundle covered by sclerenchymatous cell Vascular bundle – conjoint, collateral, closed with ‘Y’ shape xylem | 2 layers of vascular bundle, each vascular bundle covered by sclerenchymatous cell Vascular bundle – conjoint, collateral, closed with ‘Y’ shape xylem |
| 8 | Pith | Middle parenchymatous region of the stem with starch grain | Middle parenchymatous region of the stem with starch grain | Middle parenchymatous region of the stem with starch grain |

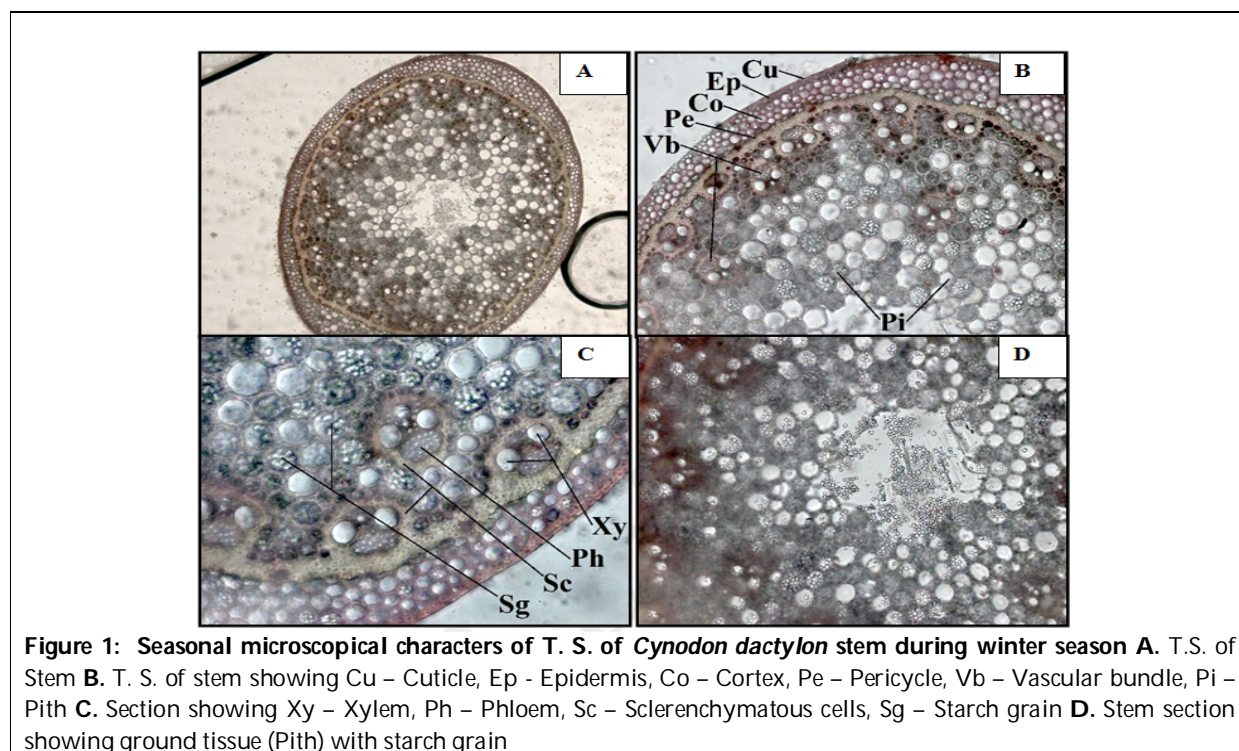


Figure 1: Seasonal microscopical characters of T. S. of *Cynodon dactylon* stem during winter season A. T.S. of Stem B. T. S. of stem showing Cu – Cuticle, Ep - Epidermis, Co – Cortex, Pe – Pericycle, Vb – Vascular bundle, Pi – Pith C. Section showing Xy – Xylem, Ph – Phloem, Sc – Sclerenchymatous cells, Sg – Starch grain D. Stem section showing ground tissue (Pith) with starch grain





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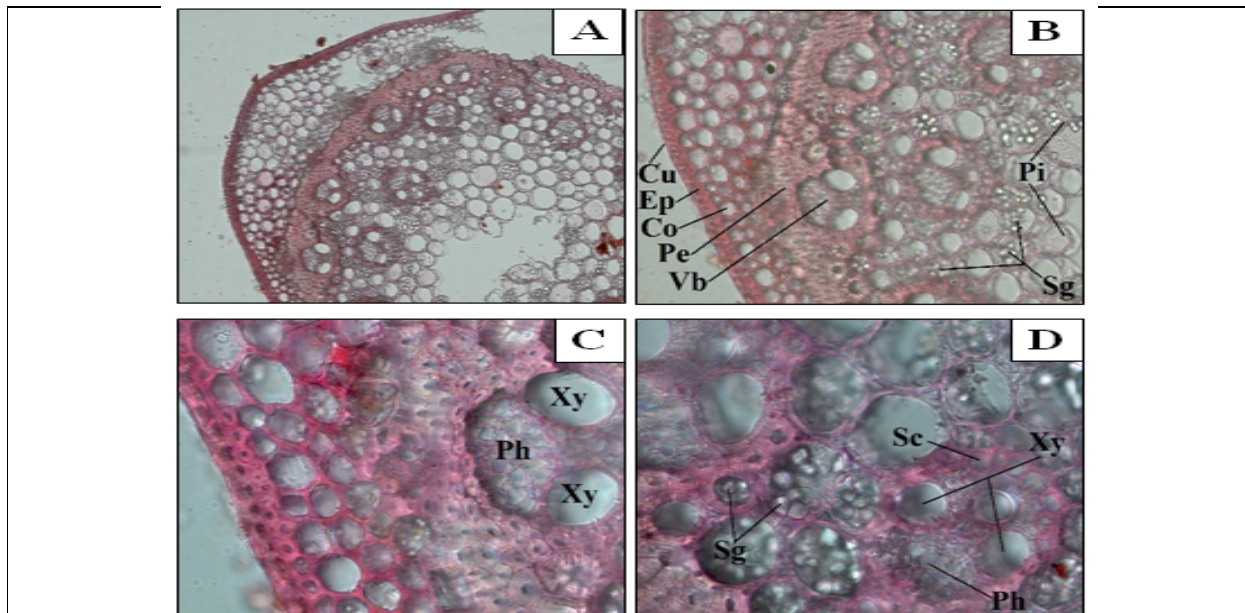


Figure 2: Seasonal microscopical characters of T. S. of *Cynodon dactylon* stem during summer season A. T.S. of Stem B. T. S. of stem showing Cu – Cuticle, Ep - Epidermis, Co – Cortex, Pe – Pericycle, Vb – Vascular bundle, Pi – Pith, Sg – Starch grain C. Section showing Xy – Xylem, Ph – Phloem D. Stem section showing vascular bundle with xylem and phloem, Sc – Sclerenchymatous cells, Sg – Starch grain

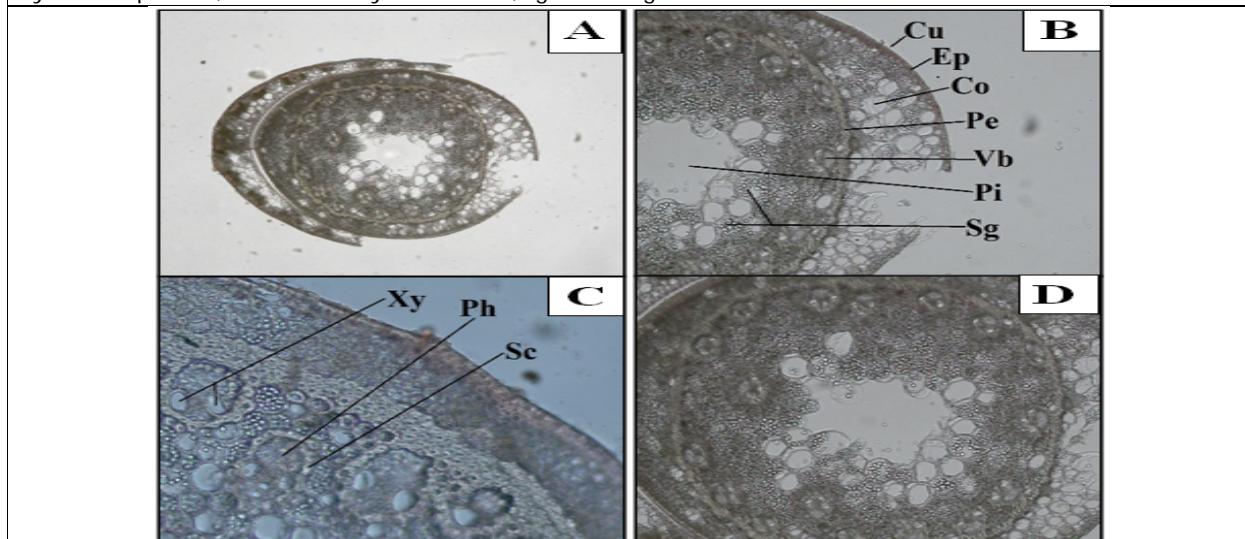


Figure 3: Seasonal microscopical characters of T. S. of *Cynodon dactylon* stem during monsoon season A. T.S. of Stem B. T. S. of stem showing Cu – Cuticle, Ep - Epidermis, Co – Cortex, Pe – Pericycle, Vb – Vascular bundle, Pi – Pith, Sg – Starch grain C. Section showing Xy – Xylem, Ph – Phloem and Sc – Sclerenchymatous cells D. Stem section showing arrangements of vascular bundle and ground tissue (Pith cell) with starch grains.

