

**PLANTS FROM BOTANICAL GARDEN: *BOTHRIOCHLOA BLADHII*
(RETZ.) S.T.BLAKE (SYSTEMATICS, MORPHOLOGY AND BIOLOGY)**

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Abstract

Classified in the Poaceae's family and Andropogoneae's tribe, Bothriochloa bladhii (Caucasian bluestem, Australian beardgrass) is widely distributed through Africa, Asia and Australia, in savannas, open forests and grasslands, often on alluviums. In the Romanian Flora (vol. XII) it is mentioned by its synonym – Bothriochloa intermedia (R.Br.) A.Camus. Subspontaneous spread in our botanical garden, B.bladhii is a perennial grass, with densely caespitosed stems on short stolons; inflorescence-panicle subdigitat; two uniflorous spikelets at the joint, one hermaphrodite, sessile, the other one pedicellate, sterile, with the awn arising from the sessile spikelet. In the internal structure of the culms, the hypoderm and the main part of the basic parenchyma are strongly sclerificated after flowering.

INTRODUCTION

In Romanian flora the genus *Bothriochloa* (*Andropogon*) is represented by two species: *B. ischaemum* (*A. ischaemum*, *A. angustifolius*) – spontaneous, perennial herbs, largely distributed on oligotrophic, rocky, barren, sandy, calcareous, sunny soils, ranging from plain to sub mountain regions [8] considerate without fodder value, at least indicate to stabilize barren slopes [1]; *B. intermedia* (*A. intermedius*) – perennial herbs too, it occurs subspontaneous spread in lawn in the botanical garden of the University of Bucharest [8], and of the University of Agronomic Sciences and Veterinary Medicine of Bucharest [7].

In some works, *Bothriochloa* (*Andropogon*) genus is included in *Dicanthium* [5, 2] or these two geniuses are distinct [4]. There are, also, works with *Bothriochloa bladhii* which comprise *B.intermedia* (*A.intermedius*) [9]. The difficulties of the taxonomy of *Bothriochloa* genus arises from the large variability of their species. *Bothriochloa bladhii* is treated in a wide sense and include all the specimens with an elongate inflorescence [9].

In this article we present some aspects of the taxonomy, morphology, anatomy and biology of the *Bothriochloa bladhii* plants acclimatized in our botanical garden.

MATERIAL AND METHODS

This study was based on morphological and anatomical observations conducted on plants from Botanical garden of UASVM – Bucharest and on taxonomic data from an international bibliography.

For microscopic examination were used cross sections obtained from floriferous stem, young shoots and leaves. These were stained by alau-carmin and jod-grun for study with a light microscope (BA 2500 with phase contrast); photos were taken with a digital camera (Panasonic DMC-LZ7).

RESULTS AND DISCUSSION

The *Bothriochloa bladhii* taxonomy

The genus *Bothriochloa* (*Poaceae*, *Andropogoneae*) is distinguished from the *Andropogon* by differential characters including the upper lemma of the sessile spikelet (not cleft to *Bothriochloa*, 2-lobed or 2-cleft to *Andropogon*) [4] or the inflorescence (1-many fragile racemes to *Dicanthium* (*Bothriochloa*), paired or digitate fragile racemes to *Andropogon*) [2, 5].

There are 20 synonyms included in *B. bladhii* (Retz.) S.T.Blake – *Amphilopsis glabra* (Roxb.) Stapf, *Andropogon bladhii* Retz., *Andropogon caucasicus* Trin., *Andropogon glaber* Roxb., *Andropogon haenkei* Presl., *Andropogon intermedia* (R.Br.) Stapf, *Andropogon intermedius* R.Br., *Andropogon intermedius* var. *caucaica* (Trin.) Hack., *Andropogon odorata* (Lisboa) A.Camus, *Andropogon odoratus* Lisboa, *Andropogon punctatus* Roxb., *Bothriochloa caucasica* (Trin.) C.E.Hubbard, *Bothriochloa glabra* (Roxb.) A.Camus, *Bothriochloa haenkei* (Presl.) Ohwi, *Bothriochloa intermedia* (R.Br.) A.Camus, *Bothriochloa* var. *punctata* (Roxb.) Keng, *Bothriochloa odorata* (Lisboa.) A.Camus, *Dicanthium bladhii* (Retz.) Clayton, *Dicanthium intermedii* (R.Br.) DeWet&Harlan, *Sorghum caucasicum* (Trin.) Griseb [9]. In *B. bladhii* were included all the specimens with elongate inflorescence (lax, ovoid-elongated panicle), different from *B. ischaemum* inflorescence, composed of digitaly or subdigitaly arranged branches [8].

The *Bothriochloa bladhii* morphology

Perennial grass, with densely caespitosed stems on short rhizomes (figure 1); culms vigorously developed – 45 cm tall, erect to slightly geniculate (figure 2); blade linear, 7 mm wide; short ligulae – 1 mm long, with 2 lateral hairy tufts.

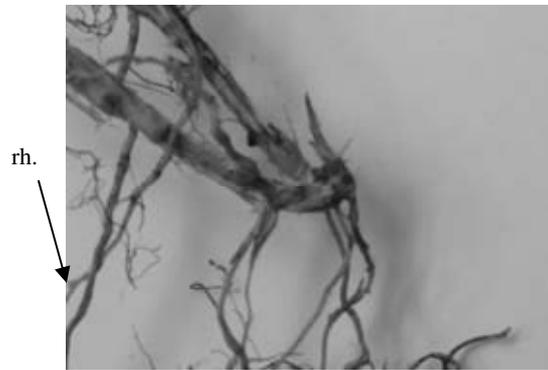


Fig. 1. Rhizome (rh) and culm's base



Fig. 2. The plant from botanical garden

Inflorescence-panicle subdigitat with two uniflorous spikelet at the joint, one sessile, hermaphrodite, the other one pedicellate, sterile, with awn arising from the sessile spikelet (figure 3).



Fig. 3. Spikelets

The stem, shoot and leaf anatomy

In the transection of the internodes of floriferous stem are visible the epidermis, the fundamental tissue and the vascular bundles (figure 4).

The epidermis consists of 1 cells row with strongly lignificated lateral and internal walls; the outer wall is thin and convex.

The fundamental tissue has become a sclerenchymatous one, composed by strongly lignificated cells, and only in the middle of the cross section it can be observed some parenchymatous tissue.

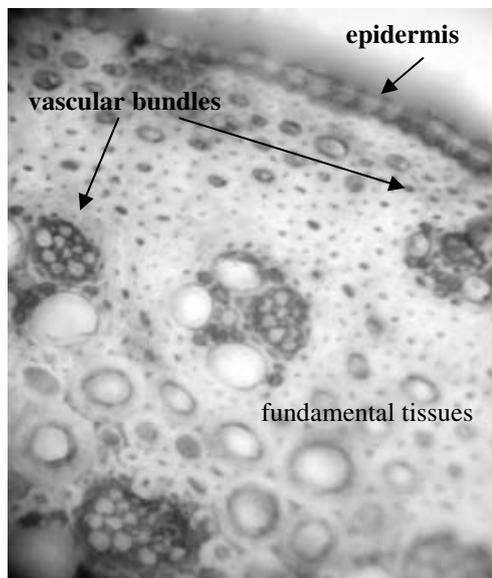


Fig. 4. The stem in cross section

The vascular bundles are distributed according to one of the herbaceous monocotyledon basic plans [3]. They are scattered throughout the transection, with smaller bundles densely arranged near periphery and larger bundles more widely spaced in the center. There are collateral bundles, enclosed in a sheath of sclerenchyma, distinct from the rest of the fundamental tissues.

In the cross section of the base of the shoot are observed the folded leaf and the protective sheath (figure 5). The form of the folded leaf is convoluted and the intern structure is the same as the active leaf.

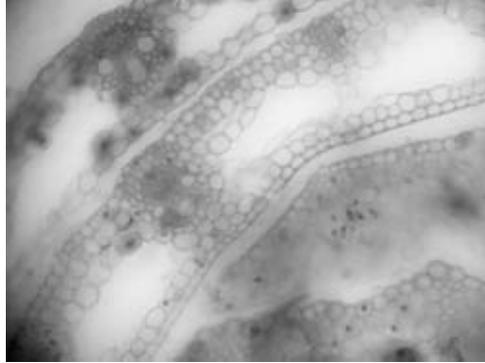


Fig. 5. The sheath (sh) and the folded leaf (leaf)

The outer epidermis of the protective sheath is composed of thin, cellulose-walled cells distributed in one row as in the inner epidermis. Between the two epidermises there is a spongy parenchyma, disorganized between vascular bundles. The vascular bundles are the collateral ones, with 2 sclerenchymatous arches, the outer bigger than the inner one and almost integrate in the outer epidermis.

The upper epidermis of the *Bothriochloa* leaf is composed of the epidermal cells, stomata and bulliform cells (figure 6), and the lower epidermis includes epidermal cells and stomata too - the leaf is amphistomatic type. The homogeneous mesophyll is prominent on the adaxial surface, in front of vascular bundles.

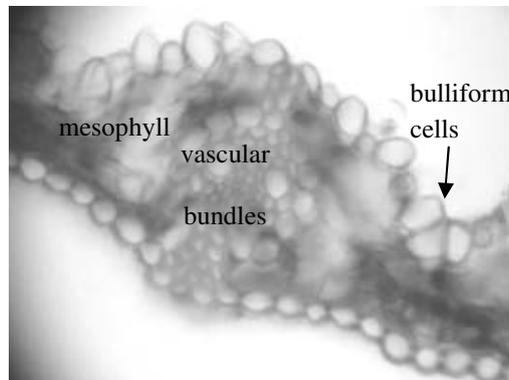


Fig. 6. The leaf in cross section

Bothriochloa bladhii plants from our botanical garden undergo mainly a vegetative multiplication.

CONCLUSIONS

1. *Bothriochloa intermedia* (R.Br.) Camus is a synonym of *Bothriochloa bladonii* (Retz.) S.T. Blake.
2. In the floriferous stem structure there is a strongly sclerificated ground parenchyma and the vascular bundles are scattered throughout the transection.
3. The base of the shoot is made up of a protective sheath and a convoluted folded leaf.
4. The leaf is amphistomatic, with bulliform cells in upper epidermis and a homogeneous mesophyll.
5. Vegetative multiplication is the main form of reproduction to plants from botanical garden.

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