

CHAPTER 1

Bromus pectinatus Thunb. Morphology

ABSTRACT

A description of *Bromus pectinatus* Thunb., a grassy weed of Kenya, is presented. The description is used to determine *Bromus* species that might be closely allied to *B. pectinatus*. Kenyan Chess is suggested as a common name for *B. pectinatus*.

INTRODUCTION

McNeill (1976) states:

in weed science there is a continuing need for clear, easily used and up-to-date manuals permitting recognition of weed species at all stages of their development.

In Kenya grassy weeds, such as *Bromus pectinatus* Thunb., can be difficult to identify. Clayton (1971), of the *Flora of Tropical East Africa* series, contains descriptions of the grassy weeds found in Kenya. However, to many weed researchers in Kenya, the descriptions given in this series are difficult to use. Difficulties arise because all grasses, not just weedy grasses, are listed and the botanical descriptions provided may neglect the terminology and characteristics to which a weed researcher is used to working. It has also been observed by this author that some of the ranges of measurements of plant parts given for *B. pectinatus* by Clayton (1971) and for *B. adoensis* Steud. (*B. pectinatus*) by Napper (1966) and Bogdan (1958) are not the

same as what this author has measured. This report presents a description of *B. pectinatus* which the author believes is more suitable to weed researchers than is the description given in Clayton (1971).

An extensive search of the literature has revealed that there is little information on management of *B. pectinatus*. The reasons for the lack of information is that *B. pectinatus* has only recently become a weed of concern and where it is of concern is mainly in countries which have underdeveloped weed research programs. Hints as to which management techniques might suppress *B. pectinatus* weediness might be found by studying the literature available on closely allied *Bromus* species. Closely allied *Bromus* species, most likely, would be morphologically and karyotypically similar. This report determines those *Bromus* species which are most likely to be closely allied to *B. pectinatus*.

MATERIALS AND METHODS

The plants used in making the description, in this report, were identified using the description of *B. pectinatus* in Clayton (1971). Some specimens were also verified by Miss C. Kabuye at the East African Herbarium, Nairobi.

The description presented was developed from observations during numerous field trips throughout Kenya, studying herbarium specimens of *B. pectinatus* at the East African Herbarium, and observations and measurements on plants grown in field and greenhouse experiments. Many of the observations and measurements, recorded by the author, are not present in either the description of *B. pectinatus* by Clayton (1971) or

the descriptions of *B. adoensis* Steud. (*B. pectinatus*) by Bogdan (1958) or Napper (1966).

The description is written up according to the style suggested by Stearn (1973).

Mature plant height was measured as the distance from the soil surface to the apex of the highest spikelet when the panicle was extended. Leaf width was measured at the widest portion of the leaves. Leaf length was measured from the collar region to the leaf tip in an extended leaf. Panicle length was measured as the distance from the flag leaf collar to the apex of the highest spikelet when the panicle was extended. All other measurements were direct.

For this report a closely allied species is defined as one that has a morphological and karyotypic resemblance to *B. pectinatus*. There are approximately 50 identified species of *Bromus* (Clayton, 1971). Hitchcock and Chase (1950) divide the *Bromus* species into four morphological groupings. The description of *B. pectinatus* developed in this report is used to categorize *B. pectinatus* into one of these four morphological groups. Chromosome numbers given in Fedorov (1969) are used to decide which morphologically similar *Bromus* species are broadly karyotypically similar to *B. pectinatus*.

RESULTS AND DISCUSSION

Morphological Description of *Bromus pectinatus* Thunb.

Growth habit, tufted annual grass, 10-90(-125) cm high; *Roots*, fibrous; *Culms*, solitary, slender, erect, bent at base, very

occasionally rooting from a lower node, almost all culms will bear an inflorescence; *Leaf sheaths*, pubescent, keeled, tubular, sometimes splitting, basal sheaths often reddish tinged; *Ligule* (Figure 2-2), long, membranous, lacerate; *Collar*, narrow, distinct, divided; *Leaf blades*, 5-12(-16) mm wide, 5-30 cm long, V-shaped, keeled, lanceolate, acuminate tipped, rounded base, smooth margins, scabrid adaxial surface, smooth abaxial surface, leaf surfaces sometimes puberulent, mature leaves often twisted, auricles absent, first leaf clockwise twisted (Figure 2-1); *Inflorescence* (Figure 2-3), open, oblong, nodding, panicle, 5-25 cm long; *Spikelets* (Figure 2-6), 10-30 mm long, 4-9 flowered, laterally compressed, except for basal seed, readily disarticulates below glumes when mature; *Glumes* (Figure 2-7 and 8), lanceolate, keeled, laterally compressed, acuminate three-nerved lower glume 5-10 mm long, acute five-nerved upper glume 7-14 mm long; *Lemma* (Figure 2-5), narrowly ovate, seven nerved, acutely bidentate, two or more keels, scabrous; callus short and rounded; awn, simple, straight, arising 1-3 mm below hyaline tip, 7-17 mm long, lower awns often shorter than upper; *Palea* (Figure 2-4), reaches to awn base, translucent, keels pectinate-ciliate with hairs to 0.5 mm long; *Anthers*, yellow, 1 mm long, three stamens; *Grains*, dark brown to light grey-green, elliptical.

Similar Species

Using the criteria, that *B. pectinatus* is an annual, with straight awns less than 17 mm long, spikelets which are terete before anthesis and broad lemmas with short (< 1 mm) teeth, would place it within the *Bromium* grouping of Hitchcock and Chase (1950). The names of the *Bromus*

KENYAN CHESS
(*Bromus pectinatus* Thunb.)

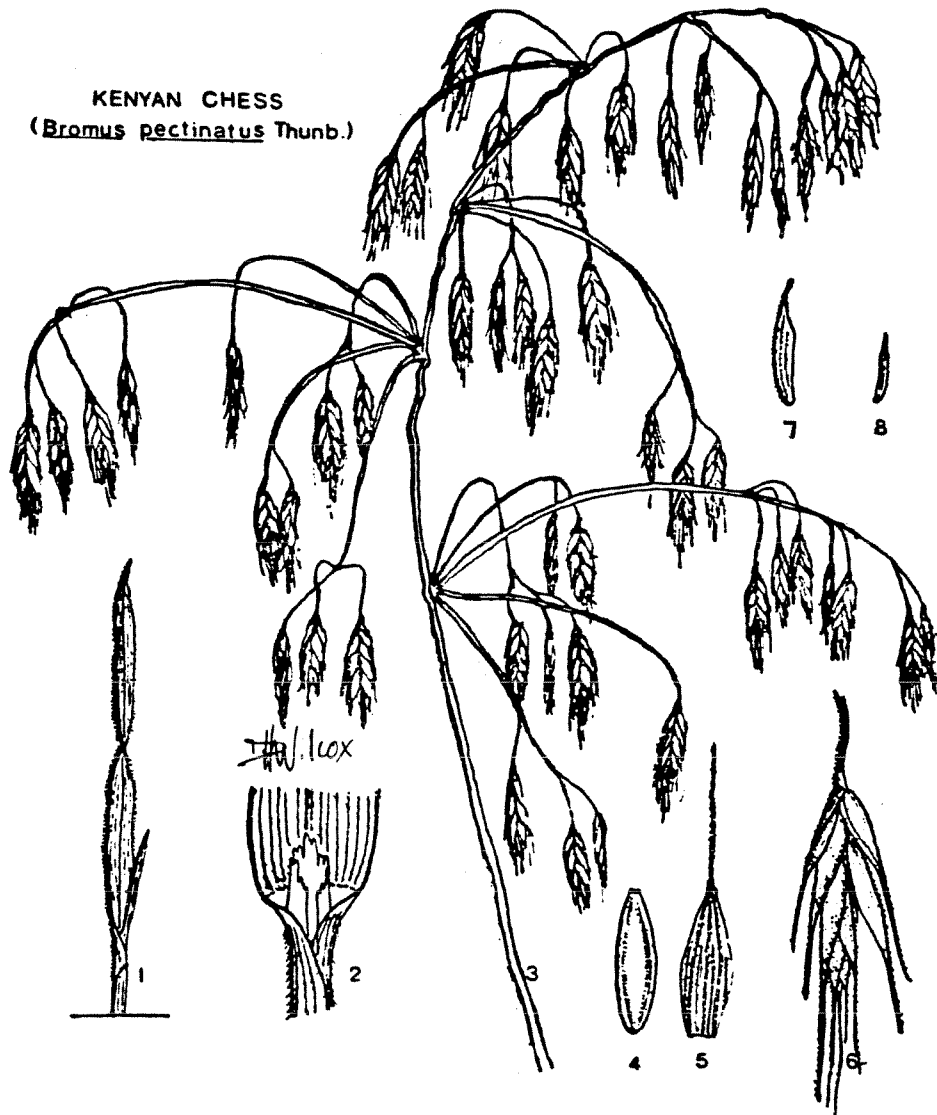


Figure 2. *Bromus pectinatus* - 1, seedling x 1.0; 2, ligule x 2.0; 3, inflorescence habit x 0.25; 4, palea x 2.0; 5, lemma x 2.0; 6, spikelet x 1.5; 7, upper glume x 1.0; 8, lower glume x 1.0

species that Hitchcock and Chase (1950) list in the *Bromium* group are presented in Table 1.

Fedorov (1969) states that *B. adoensis* Hochst (*B. pectinatus*) has 28 chromosomes. Table 1 lists the chromosome numbers of Hitchcock and Chase's (1950) *Bromium* group as they are given in Fedorov (1969). Only some members of this *Bromium* group contain 28 chromosomes. They are *B. mollis*, *B. secalinus*, *B. racemosus*, *B. commutatus*, *B. brizaeformis* and *B. arenarius*. It is these species which are most closely allied to *B. pectinatus*.

The conclusion that these species are closely allied with *B. pectinatus* has some basis in the literature. Clayton (1971) suggests that *B. arenarius* is probably not distinct from *B. pectinatus*. Hitchcock and Chase (1950) suggest that *B. commutatus*, *B. mollis*, *B. racemosus* and *B. secalinus* are closely allied, differentiated only by arbitrary characters, and Hulbert (1955) suggests that they may even all belong to one species.

Kenyan Chess

Table 1 lists the common names of many members of the *Bromium* group. They all include the word Chess in their name. In Kenya there are two weedy *Bromus* species, *B. diandrus* and *B. pectinatus* (Clayton, 1971). However, in Kenya there is only one common name used for both - brome grass. These two *Bromus* species are distinct and one, *B. pectinatus*, is more of a weed than the other. The common name of *B. diandrus* in the U.S.A. is ripgut grass (Hitchcock and Chase, 1950) but there is no common name for *B. pectinatus*. It is proposed that the common name "Kenyan Chess" be assigned to *B. pectinatus*, following the

Table 1. Scientific name, common name and chromosome numbers of members of the *Bromium* group of genus *Bromus* (Hitchcock and Chase, 1950; Fedorov, 1969).

Scientific Name	Common Name	Chromosome Number (2n)
<i>B. arenarius</i> Labill	Australian Chess	28
<i>B. arvensis</i> L.	-	14
<i>B. brizaeformis</i> Fisch. and Mey.	Rattlesnake Chess	28
<i>B. commutatus</i> Schrad.	Hairy Chess	14, 28, 56
<i>B. japonicus</i> Thunb.	Japanese Chess	14
<i>B. molliformis</i> Lloyd.	-	-
<i>B. mollis</i> L.	Soft Chess	28
<i>B. racemosus</i> L.	-	28
<i>B. secalinus</i> L.	Chess	28 (14)
<i>B. squarrosus</i> L.	-	14

tradition of other members of the *Bromium* group.