Bhutanese bamboos: A simple key and background information on the genera

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INTRODUCTION

Bamboos are an extremely important group of woody grasses but they are probably the least appreciated and understood of all forest plants. As well as providing constructional, weaving, and fencing materials, animal fodder, and one of the most profitable vegetables that marginal land can sustain, they also offer extremely good protection against surface soil erosion.

In subtropical areas they occur naturally as sub-dominants in mixed broadleaved forest, and they are also widely planted on private land. In temperate forests they are often very common in the understorey and provide valuable minor forest products, harvested systematically for roofing and fencing materials. In alpine pastureland dwarf species can form extensive areas of winter-green grazing. By providing dense evergreen groundcover they are also of great value to wildlife, providing food and breeding grounds for many threatened species.

While many bamboos are very useful there are also several which are a nuisance, inhibiting tree regeneration and providing few useful products. Some species are edible and can provide a valuable cash income while others are strongly poisonous. Therefore, in order to assess the value of particular bamboos it is necessary first to be able to identify them accurately.

Unfortunately bamboo taxonomy has been neglected worldwide until this decade, and it is still not possible to identify in many countries. They are among the most difficult plants from a taxonomic point of view, and taxonomists have usually avoided them as much as possible. This means that many species have never been described by anybody, and have no scientific name at all. Those which have a scientific name are usually so badly described that it is often extremely difficult to tell which bamboo the author was actually talking about. Local names are useful up to a point, but they are usually inconsistent in different areas and people often disagree within the same area.

It is not necessary to elaborate upon the consequences of such a state of ignorance. Nobody would pretend to be able to run a hospital property when the names of the drugs and diseases are not known. How can we pretend to be managing the forests or the environment if the plants have no proper names?

In an attempt to help people to make better use of their bamboos a British forester tried to describe all the bamboos of South Asia, Malaysia and the Himalayas (Gamble, 1896), but he could not enter either Bhutan, Arunachal Pradesh or Nepal. Since then no revision of his names and descriptions has been undertaken for Himalayan bamboos, although many new names for genera have been proposed by taxonomists in other countries. Consequently most references to bamboo species in the Eastern Himalayas have always been guesswork: usually inaccurate, misleading, and of little practical value.

At the moment the bamboos of Bhutan have not been identified or listed. It is not known which species are present but it is possible to list which genera, or groups of species, are likely to be found. Taxonomists disagree upon which groups to give a separate generic name to and which to merge. The reasons for selecting these genera have been detailed elsewhere, and more technical keys have also been prepared (Stapleton, 1988), but they require far more understanding of grass structure and terminology. In this key I have used the most important and reliable vegetative details to give a simplified key to these groups, aiming at a level which could be used by a forester or forest ranger to get most of the bamboos encountered into the right genus. The groups are then described to give some further basic information. A glossary of terms used in the key is given below.

The next step, to be undertaken with the Research Division of the Forestry Department, is to collect, describe, and draw the individual species, attempting to correlate them with the poor and confused descriptions of species in the literature and the fragmentary collections in herbaria in other countries, so that names given in the past are recognised according to the rules of taxonomy, and species which have never had a name assigned can be named to give a complete and accurate classification of Bhutanese bamboos for the first time.

When the species are known it will be possible to make more keys, and the identification will be made by having pictures for each species, and more details of distribution, uses and local names.

TERMINOLOGY USED IN THE KEY

clump	- a collection of many culms growing close together.
cross veins	- small veins running across the leaf seen when the leaf is held up to the light.
culm	- the stalk of a grass plant, a pole in large bamboos.
dbh	- culm diameter measured 1.3m above the ground (breast height).
genera	- groups of species with certain similarities.
internode	- the section of a culm between two nodes.
long veins	- veins running along the length of the leaf.
node	- the part of the culm where branches arise, marked by a ring.
rhizome	- underground stem from which new culms and roots grow.
spreading	- not growing in clumps.

KEY TO BAMBOO GROUPS FOR USE IN BHUTAN

Clump-forming bamboos:
culms growing in well separated clumps of more than 10 culms.

Maximum dbh > 8cm

Culm covered with dark or thick fur, central branches varied, often very large	*Dendrocalamus* (1)
Culm with light covering of pale wax, central branches fairly uniform, usually quite small	*Bambusa* (2)

Maximum dbh <8cm

Maximum internode length > 40cm

Culm nodes without corky collar	*Cephalostachyum & Teinostachyum (4)*
CuIm nodes with corky collar	*Ampelocalamus* (5)

Maximum internode length <40cm

Culm nodes with thorns	*Chimonocalamus* (11)
Culm nodes without thorns	
Buds short, onion-shaped	*Drepanostachyum* (9)
Buds tall, chilli-shaped	*Thamnocalamus* (12)

Spreading bamboos:
culms growing separately or in small groups of less than 10 culms

Culms with rings of thorns around the nodes	*Chimonobambusa (7)*
Culms with no thorns	
Leaves with no cross veins, long veins only	
Maximum dbh > 4 cm	*Melocanna* (3)
Maximum dbh 2-4 cm	*Pseudostachyum (6)*
Maximum dbh < 2 cm	*Racemobambos* (15)
Leaves with distinct cross veins as well as long veins	
Long rhizome lengths without roots	*Yushania* (13)
Rhizome rooting along entire length	*Arundinaria* (14)

BRIEF INTRODUCTION TO THE GROUPS

I LARGE STATURE BAMBOOS

1. ***Dendrocalamus*** (Nees 1835)

The largest of all bamboos are in this genus, with dbh usually around 9-10 cm, but up to 30Cm ~n some species, and height usually 1 2m, but up to 30m. Distribution is tropical and subtropical, 0-1 800m above sea level, as the plants will only survive a few degrees of frost. The culms are usually thin-wailed with cavities. They are used whole or split and woven to make fences, house wails, thatch supports, mats, baskets, and trays. The leaves give valuable fodder for animals, and the shoots are often edible and can be preserved.

2. ***Bambusa*** (Schreber 1789)

Usually a little smaller than *Dendrocalamus,* with dbh of around 6-9 cm and top height of 6-10m.

Distribution is also tropical and sub-tropical, 0-1 800m. The culms are either thin-walled as in *Dendrocalamus* or thicker with a smaller cavity. When thin-walled they are usually split and woven. When thick-walled they are often used whole for construction and scaffolding.

3. ***Melocanna*** (Trinius (1820)

This small group is widely planted in the plains and barely extends into Bhutan. The culms are a little smaller than those of Bambusa, around 5-7 cm dbh, 6-8m tall and they grow well spread out, at a distance of about 1.5 to 2m apart. The culms are very straight but not particularly strong. The fruit is the size and shape of a pear.

II BAMBOOS OF INTERMEDIATE SIZE

4. Cephalostachyum and Teinostachyum **(Munro** 1868)

These two genera of clump-forming bamboos are very similar and cannot be separated without the flowers. They have long internodes of up to 60m, dbh of up to 5cm, and height of up to 5m, and the leaves are often very large for the size of culm. They grow in high rainfall areas at elevations of around 1500- 2000m. They are very useful for weaving, and are the right size for making flutes. When the species of Bhutan are better known it should be possible to find a vegetative character to separate the two genera, or at least it will be possible to determine the genus from an identification of the species. Some taxonomists think that these genera should be joined with the Malaysian genus, ***Schizostachyum*** but this is controversial and has not yet been formalised.

5. ***Ampelocalamus*** (Chen, Wen, & Sheng 1981)

A group which is very similar to ***Cephalostachyum.*** The Himalayan species has a frilly corky collar at the nodes.

6. ***Pseudostachyum*** (Munro 1868)

This group has just one species. It is a spreading bamboo with thornless culms growing on their own or in small groups. They are up to 5 cm dbh and 5m tall, with extremely thin walls, only 2-4mm thick. The distribution seems to be restricted to hot high rainfall areas at low altitude, below about 600m. They are easily split or crushed for weaving or making mats.

7. ***Chimonobambusa*** (Makino 1914)

Bamboos of this group spread widely, with thorny culms of less than 5cm dbh growing singly. They are found in cooler high rainfall areas around 1400-1800m. The culms are brittle and of little use.

8. ***Phyllostachys*** (Sieb., & Zucc., 1843)

These Chinese spreading bamboos are still rare in Bhutan and only found cultivated, so they have not been included in the key. They are not round as most other bamboos, having a flattened side above the branches, which are usually in twos, one strong branch with a smaller one beside it. CuIm dbh 3-5cm, height up to 6m.

III SMALL STATURE CLUMP-FORMING BAMBOOS

9. ***Drepanostachyum*** (Keng 1983)

Common subtropical to temperate clump-forming bamboos of southern Bhutan with dbh of 1-2.5cm and height of up to 4m. Widely planted on private land and common in forest areas, and used in great quantity for weaving baskets, mats and trays. Found from 1000 - 1800m.

10. ***Himalayacalamus*** (Keng 1983)

Cool-temperate clump-forming forest bamboos giving higher quality weaving material, with dbh of 2-3cm and height up to 5m, probably restricted to 2200 - 2500m in Samchi district if they occur in Bhutan at all.

11. ***Chimonocalamus*** (Hsueh & Yi 1979) 

Similar to *Himalayacalamus* but with thorns.

12. ***Thamnocalamus****(Munro* 1868) 

Cold-temperate frost hardy clump-forming bamboos, up to 3.5cm dbh. Some species are very valuable for weaving roof mats and fencing, and are commonly planted, but most species are not so useful.

IV SMALL-STATURE SPREADING BAMBOOS

13. ***Yushania*** (Keng 1957)

Spreading thornless frost-hardy bamboos common from 1800 - 3500m. The larger species are up to 2.5cm dbh, forming dense thickets. The smallest species are less than 1 m tall forming pastureland which provides valuable all-year-round grazing for yaks, sheep and cattle.

14. ***Arundinaria*** (Michaux 1803) 

Rare spreading bamboos, similar to the smaller *Yushania* species, but with a different form of rhizome.

15. ***Racemobambos*** (Holttum 1956) 

Rare thin bamboos with dbh of less than 2cm, up to 4m tall with strong branches which are often as large as the culms, and spread over tree branches for support. Culms are found in small groups with long internodes, up to 50cm, and the surface is often very shiny and hard. These bamboos seem quite scarce, occurring in cool temperate broadleaved forest in high rainfall areas at around 1800m. They give the highest quality weaving material of all bamboos; strong, flexible and very durable. They are used for mats and for bangchungs, making shiny, flexible, and attractive containers.

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