MORPHOLOGICAL CHARACTERS FOR CULM AGE DETERMINATION OF DIFFERENT BAMBOOS OF BANGLADESH

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ABSTRACT

Change of morphological character of bamboo culms in relation to the age have been described. Presence or absence of culm sheath and nodal root rings, branching pattern and colour was found to be diagnostic characters for determining the age of culms ranging from 1 to 4 years in the clumps of five major bamboo species of Bangladesh.

সারসংক্ষেপ

বয়সের সাথে বাঁশের দৈহিক আকৃতির পরিবর্তন সম্বন্ধে বর্ণনা করা হয়েছে। বাংলাদেশের প্রধান বাণিজ্যিক পাঁচটি বাঁশ প্রজাতির ঝাড়ে ১ থেকে ৪ বৎসর বয়সী বাঁশ চেনার জন্য সনাক্তকারী দৈহিক গড়নগুলি চিহ্নিত ও নিরূপিত হয়েছে। ঝাড়ে বাঁশ কাণ্ডের রং এবং পর্ব মধ্যে সিথ পত্র ক্রম বিকাশের ধরন ও পর্বের উপর বায়বীয় মূলের উপস্থিতি ইত্যাদি চিহ্নিত দৈহিক গড়নগুলির অন্যতম।

INTRODUCTION

Bamboo, being a member of monocotyledonous group, does not possess any growth rings in the culms. Thus unlike dicotyledonous plant species the age of a bamboo plant cannot be determined by counting the growth rings. Generally, a farmer distinguishes between "mature" and "immature" culm by fliping or tapping with fingers. From the sound he can identify the group. Sometimes the colour of the culm is also considered.

Many workers reported that culm age is the important consideration for bamboo grove management (Troup 1921, Ueda 1960, Huberman 1959, Banik 1988). But unfortunately there have been no systematic studies on the technique of culm age determination in a clump of different major bamboo species of Bangladesh. Therefore, study was undertaken to identify the related morphological characters for determining the age of a culm in the clump of different bamboo species of the country.

MATERIALS AND METHODS

Investigations were made on the five major commercial bamboo species of Bangladesh, viz., borak, baro, barua, bhaluka *(Bambusa balcooa)* ; talla, bailla, mahal *(B. longispiculata)* ; mitinga, mita *(B. tulda)* ; baizzya, jai, bariala, bashni *(B. vulgaris)* and muli, nali, paiya *(Melocanna baccifera)*. 10-15 clumps of each species were planted in the bambusetum during 1974-1975 inside the Bangladesh Forest Research Institute campus. Every year new

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culms emerged in each of the clump. These culms were marked by a separate colour paint. Different colour paints indicated the different year of culm emergence.

The observation was made during November—December, 1988. During that time the clumps were of more than 12 years of age. The culms which emerged in 1983, 1984, 1985, 1986 and 1987 were 5, 4, 3, 2, and 1 year old respectively at the time of observation. The morphological characters such as, presence or absence of culm sheath, branching intensity, presence or absence of adventitious roots on the basal nodes, and colour and surface of the culm were considered in the study (Waheed Khan 1962). All these morphological characters were observed and recorded from the culm of 1 to 4 years of age group. The observations were confined upto 4 year old culm as bamboos are believed to attain maturity within 3-4 years of age (Liese 1985, McClure 1966, Ueda 1960).

RESULTS AND DISCUSSION

Some of the important morphological characters were recorded from different age groups of culms under each bamboo species. Characters in relation to culm age for five common bamboo species of Bangladesh are described below :

Age upto (year) — Morphological description

Borak, Barua, Bhaluka, Baro (*Bambusa balcooa* Roxb.)

1st year — Culm sheath : May be present at 2-3 basal nodes.

Bud break and branches : The large branch bud on the culm node breaks and produces a thick stout branch excepting on the basal 3-4 nodes. Comparatively small and thin 1-2 branches are also produced from both the side the main stout branch. Branch bases and some basal nodes of the culms are generally covered with straw coloured papery sheaths.

Culm : Brown to whitish pubescent ring is present on the basal 6-9 nodes, and usually basal 4-5 nodes also possess a ring of adventitious roots. Nodes are prominent and ridged. Dark glossy green. Basal 6-8 internodes are lightly covered with minute brownish hairs arranged in many vertical lines closely parallel to each other.

2nd Year — Culm sheath : Usually not present on the culms, may be present on the basal 1-2 nodes.

Bud break and branches : Excepting 4-5 basal nodes almost all buds of the culm nodes develop thick stout branches. The auxillary branches upto basal 5-6 nodes transform into curved thorn like structure. Base of the branches may be covered with thin persistent sheath.

Culm : Brown to whitish ring along with adventitious roots may be present on the basal 3-4 nodes. Not so deep green. Basal internodes are slightly covered with minute brownish hairs.

3rd year — Culm sheath : Absent.

Bud break and branches : Usually buds on the basal 3-5 culm nodes are dead and rotten. Death is more on the congested clumps. Thin wirey auxillary branches upto 9-12 basal nodes shed their leaves and transform into curved thorn like structure.

Culm : Dead adventitious root rings may be present on the basal 2-3 nodes of the culm. Deep bottle green

(hookers green) and internodal surface is smooth.

4th year Culm sheath : Absent.

Bud break and branches : Branches have less number of leaves. Most of the auxillary and secondary branches transform into curve thorn like structure. Stout thick branches on the basal nodes (upto 6) of the culm are usually dead, sheded and keeping dead scar on the culm nodes.

Culm : Smooth surface having deep bottle green colour. Black rotten or dried adventitious root ring may be present on the basal 1-2 nodes.

Talla, Bailla, Mahal (*Bambusa longispiculata* Gamble ex Brandis)

1st year Culm sheath : Generally absent. However, in some cases present on the nodes of upper portion of the culm and at the 1-2 basal nodes.

Bud break and branches : Most of the branch buds on the upper and basal nodes break and produce branches. The buds on the lower mid culm zone (5-12 nodes) remain dormant and do not produce branches.

Culm : Deep glossy green. Vertical yellow striations are prominent on the 1-5 basal internodes. White bloom is present in the internode.

2nd year Culm sheath : Absent.

Bud break and branches : Excepting a few buds 2-4 at the mid culm zone all branch buds break and produce branches.

Culm : Dark green. Vertical yellow striations are also prominent. Amount of white bloom conspicuously reduced and comes off on fingers.

3rd year Culm sheath : Absent.

Bud break and branches : Almost all the branch buds in the culm nodes break and produce branches.

Culm : Dark green, but yellow colour striations are comparatively faded. White bloom is either absent or scanty and turns greyish white.

4th year Culm sheath : Absent.

Bud break and branches : Same as previous years, but some main and thin branches at the base and upper portion of culm die and drop keeping black scars on nodes.

Culm : Uniformly dark green with no bloom on the internodes. Yellow colour striations are mostly faded.

Mitinga, Mita (*Bambusa tulda* Roxb.)

1st year Culm sheath : Usually not present on the culm, may be present on the basal 1-2 nodes and tightly fitted.

Bud break and branches : The branch bud on the culm node breaks acropetally producing stout branch, while 3-8 buds in lower mid culm zone remain dormant. Sometimes 3-5 branch buds may also remain dormant on the upper portion of the culm. Leafy branches are mostly confined to the top portion of the culm, smaller thin branches are present on the lower nodes. Branch bases and internodes cover with the straw colour sheaths.

Culm : Dark green colour with slight whitish bloom on the internode and comes off easily with finger. Basal 1-

2 nodes may have a ring of small adventitious roots. A brown to dark colour wooly band present just above the 1-3 basal nodes.

2nd year Culm sheath : Absent.

Bud break and branches : Almost all the branch buds including dormant one of the first year on the lower mid zone and upper portion of the culm become active and produce branches.

Culm : Whitish bloom may slightly present, comes off with rubbing.

3rd year Culm sheath : Absent.

Bud break and branches : Generally branchy sprouts in a branch complement on the basal 1-4 nodes of culm become dead and shed off keeping the black scars. As a result the number of thin branches at the basal portion of the culm get reduced.

Culm : Green throughout, excepting yellowish stain present at the lower part of the internodes. Basal 1-3 internodes may not have this yellowish stain.

4th year Culm sheath : Absent.

Bud break and branches : Branches on the basal 3-7 nodes and in some cases on the upper portion of the culms (2-4 nodes) become dead and shed off keeping the black scars. More number of thin branches are dead.

Culm : Dark green. Yellowish stain at lower part of the internode is comparatively prominent.

Baizzya, Jai, Bashni, Bariala (*Bambusa vulgaris* Schrad.)

1st year Culm sheath : Excepting basal 2-3 nodes no sheaths present.

Bud break and branches : One-third of culm top has leafy branches. Buds break producing central stout branches with small auxillary branches throughout culm except 3-4 basal nodes.

Culm : Bright glossy green, basal 3-4 nodes have adventitious white root rings.

2nd year Culm sheath : Light dark colour sheath may be present at 1-2 basal nodes.

Bud break and branches : More than half of the upper portion of the culm has thick stout leafy branches. Small auxillary branches disappear.

Culm : Dull grassy green. Adventitious root rings on the basal nodes are drying out and turning black.

3rd year Culm sheath : Absent.

Bud break and branches : Branches are more thick and stout with light green colour, leaves are few. Bud break start at basal 3-4 nodes but forms small thin wirey leafy branches.

Culm : Slightly yellowish green, no adventitious root rings on the node.

4th year Culm sheath : Absent.

Bud break and branches : Thick stout branches are only on the upper one-third of the culm, turning yellowish with few leaves. Buds and branches on the basal nodes mostly dead leaving black scar.

Culm : Turning yellowish, smooth.

Muli, Nali, Paiya (*Melocanna baccifera* (Roxb.) Kurz)

1st Year — Culm sheath : All nodes of the culm covered with culm sheath excepting thin tip.

Bud break and branches : No bud break on the culm node, 2-4 tip buds on the culm produce drooping large leaves directly on the nodes, no branches.

Culm : Green branchless straight culm with drooping tips having 2-4 leaves.

2nd year — Culm sheath : Sheath persist on the lower two-third culm, blade of the sheath is loosely fitted.

Bud break and branches : Buds on the one-third upper portion of the culm nodes break and produce many thin branches in assembly.

Culm : Green.

3rd year — Culm sheath : Persist loosely only on basal one-third portion of culm (3-5 internodes), mostly black colour, blade of the culm sheath shed off.

Bud break and branches : Further buds break upto two-third of the culm and many thin branches are produced in assembly with comparatively less number of leaves.

Culm : Dull dark green.

4th year — Culm sheath : Absent.

Bud break and branches : Buds mostly dead on the basal culm nodes. Some branches in the branch assembly die mostly on the upper portion of the culm. Leafy branches are less, dead leaves scars present on the branches.

Culm : Light green to yellowish straw colour.

Thus it appears that nature of culm sheath, bud break and development of branches on the culm are distinctly changing with the age. In general, presence or absence of culm-sheath on the culm, culm colour and branching pattern can be regarded as most important morphological characters for determining the age of a culm in the clump of above bamboo species of Bangladesh.

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