

## BAMBOO – CONSERVATION AND ESTABLISHMENT OF BAMBUSETUM AT JK PAPER LTD.

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### Introduction

Bamboos, regarded as the “Poor man’s timber” (Watt, 1889) belonging to family Poaceae, have been associated with human civilization since ages. The important genera of bamboos are *Arundinaria*, *Bambusa*, *Cephalostachyum*, *Dendrocalamus*, *Gigantochloa*, *Melocanna*, *Ochlandra* etc. (Bahadur and Jain, 1981). Ohrnberger and Goerrings (1985) reported the occurrence of 110 genera and 1,110-1,140 species of bamboos in the world. Seethalaskhmi and Muktesh Kumar (1998) reported 18 genera and 128 species found in India. Bamboos are naturally distributed in all the states of India except in Jammu & Kashmir.

### Propagation

Bamboos can be grown under different climatic conditions and in a wide range of soils as compared to other timbers. Bamboo plant consists of three morphological parts – the aerial part (culm) and two under ground parts (rhizome and root) and for proper establishment, the propagule should have developed all three structures. Failure in development of any of these structures leads to failure of the propagule (Banik, 1980). Due to the scarcity of seeds,

bamboo is generally propagated by vegetative methods such as culm division – offset, rhizome, whole culm cutting, layering, culm segment cutting, branch cutting and macroproliferation. Bamboo propagation by offset and rhizome planting are the most common methods applied in the country. However, the availability of these propagules is very limited and is useful only for small scale plantings. Besides, these propagules are very expensive being bulky, difficult to extract and transport. Culm segments are also used for propagation of bamboos (Cabanday, 1957; Surendran *et al.*, 1983). Conservation of bamboo genetic resources is important because as flowering, in most of the cases, is irregular and uncertain. Therefore *ex-situ* and *in-situ* conservation is desirable.

### Conservation at Bambusetum, Jaykaypur

Bamboo is used in the Paper Industries as a raw material for paper production as well as widely used by tribals in the country for various purposes. It is intimately linked with socio-economic activities of the people. Keeping this in view, JK Paper Ltd. has established a Bambusetum at Jaykaypur, Rayagada

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(Orissa) (Lat. 19° 15' 14.3" N; Long. 83° 24' 54.7" E; altitude 258 m amsl), to study growth related activities, containing 26 species collected from 50 provenances/sources at its R&D field centre (Agro Economic Research Centre (AERC)/Tree Improvement Centre (TIC) Forest Research Centre (FRC). The objectives are to improve germplasm, species specification and mass multiplication with wide distribution to farmers, State Forest Departments, Government and Non-Governmental Organisations etc.

### Material and Methods

Rhizome/offsets/tissue culture raised 26 bamboo species were collected from more than 50 provenances/sources and established in a Bambusetum at AERC and germplasm of its improved material were established at TIC and FRC through rhizome/macro-proliferation to multiply

the various species such as *Bambusa polymorpha*, *Melocanna baccifera*, *Dendrocalamus hamiltonii*, *Bambusa balcooa*, *B. bambos*, *D. calostachyus*, *D. membranaceus*, *D. strictus*, *B. tulda*, *B. nutans*, *D. giganteus*, *B. striata* and *B. wamin*.

Culm-production studies of *Bambusa nutans*, *D. membranaceus*, and *D. strictus* were observed under an escapement of 4 m x 3 m (64 plants per plot).

### Results

It has been observed that bamboo species planted in bambusetum are very encouraging. List of the species is given in Table 1. Culm-production observation shows maximum 130 culms in clump no.2 in *B. nutans* with average culms as 62.7 followed by 57.5 in *D. membranaceus* (Table 2).

**Table 1**

*List of bamboo species planted at Jaykaypuram Bambusetum*

| Sl. No. | Species                               | Local name  | Source/Provenance                                                                                                         |
|---------|---------------------------------------|-------------|---------------------------------------------------------------------------------------------------------------------------|
| 1       | 2                                     | 3           | 4                                                                                                                         |
| 1.      | <i>Bambusa balcooa</i>                | -           | KFRI, Peechi; IFGTB, Coimbatore; Farmer's field, Muniguda, Orissa; IWST, Bangalore.                                       |
| 2.      | <i>B. bambos</i> var. <i>gigantia</i> | Daba bauns  | Forest Research Centre, Auguru; IFGTB, Coimbatore; Kalyan Singpur, Rayagada; Gumaghat, Rayagada; Gujarat; IWST, Bangalore |
| 3.      | <i>B. bambos</i>                      | Kanta bauns | Dehra Dun; Narayanpatna, Orissa; Forest Research Centre, Auguru, Rayagada, Orissa                                         |
| 4.      | <i>B. glutens</i>                     | -           | KFRI, Pechi (Kerala).                                                                                                     |
| 5.      | <i>B. longispiculata</i>              | Flute bauns | FRC, Auguru, Rayagada                                                                                                     |

*Contd...*

| 1   | 2                            | 3             | 4                                                                                                         |
|-----|------------------------------|---------------|-----------------------------------------------------------------------------------------------------------|
| 6.  | <i>B. nutans</i>             | Badi bauns    | KFRI, Peechi; TFRI, Jabalpur; Assam; Jaykaypur; IFGTB, Coimbatore                                         |
| 7.  | <i>B. polymorpha</i>         | -             | Dehra Dun                                                                                                 |
| 8.  | <i>B. stachys</i>            | -             | KFRI, Peechi (Kerala)                                                                                     |
| 9.  | <i>B. tulda</i>              | Bolangi bauns | TFRI, Jabalpur; KFRI, Peechi; IFGTB, Coimbatore; Jaykaypur                                                |
| 10. | <i>B. vulgaris</i>           | Sundarkani    | IFGTB, Coimbatore; FRC, Auguru; Dehra Dun                                                                 |
| 11. | <i>B. striata</i>            | Champa bauns  | FRC, Auguru; KFRI, Peechi                                                                                 |
| 12. | <i>B. wamin</i>              | Pitcher bauns | FRC, Auguru, Rayagada, Rayagada                                                                           |
| 13. | <i>Dendrocalamus asper</i>   | Edible bauns  | IFGTB, Coimbatore; KFRI, Peechi; TFRI, Jabalpur                                                           |
| 14  | <i>D. bagodiceae</i>         | -             | KFRI, Peechi                                                                                              |
| 15  | <i>D. brandisii</i>          | -             | IWST, Bangalore                                                                                           |
| 16  | <i>D. calostachyus</i>       | -             | Dehra Dun                                                                                                 |
| 17  | <i>D. giganteus</i>          | -             | Central Forest Office, Rayagada                                                                           |
| 18  | <i>D. hamiltonii</i>         | -             | Dehra Dun                                                                                                 |
| 19  | <i>D. varegata</i>           | -             | Vishakapatnam (Andhra Pradesh)                                                                            |
| 20  | <i>D. membranaceus</i>       | Seed bauns    | Dehra Dun; TIC, Jaykaypur                                                                                 |
| 21  | <i>D. stocksii</i>           | -             | IFGTB, Coimbatore                                                                                         |
| 22  | <i>D. strictus</i>           | Salia bauns   | Pokhri Bandh, Baliguda; Gujarat; FRC, Auguru; KFRI, Peechi; Dehra Dun; IFGTB, Coimbatore; IWST, Bangalore |
| 23  | <i>Gigantochloa rostrata</i> | Pani bauns    | Kalyan Singpur, Orissa                                                                                    |
| 24  | <i>Guadua angustifolia</i>   | -             | IFGTB, Coimbatore                                                                                         |
| 25  | <i>Melocanna baccifera</i>   | Muli bauns    | Tripura                                                                                                   |
| 26  | <i>Thyrsostachys regia</i>   | Lathi bauns   | FRC, Auguru, Rayagada, Orissa                                                                             |

**Table 2***Culm production studies of bamboo*Species : *Bambusa nutans*

| Clump No | 2004<br>Total | 2005 |       | 2006 |       | No. of culms thinned | Grand total |
|----------|---------------|------|-------|------|-------|----------------------|-------------|
|          |               | New  | Total | New  | Total |                      |             |
| 1        | 2             | 3    | 4     | 5    | 6     | 7                    | 8           |
| 1        | 23            | 11   | 34    | 24   | 58    | 33                   | 91          |
| 2        | 41            | 8    | 49    | 19   | 68    | 62                   | 130         |
| 3        | 12            | 2    | 14    | 7    | 21    | 19                   | 40          |
| 4        | 34            | 7    | 41    | 12   | 53    | 34                   | 87          |
| 5        | 11            | 4    | 15    | 7    | 22    | 21                   | 43          |
| 6        | 13            | 3    | 16    | 2    | 18    | 12                   | 30          |
| 7        | 14            | 1    | 15    | 5    | 20    | 18                   | 38          |
| 8        | 28            | 11   | 39    | 9    | 48    | 23                   | 71          |
| 9        | 15            | 4    | 19    | 9    | 28    | 31                   | 59          |
| 10       | 13            | 5    | 18    | 6    | 24    | 14                   | 38          |
| Average  | 20.4          | 5.6  | 26.0  | 10.0 | 36.0  | 26.7                 | 62.7        |
| SD       | 10.6          | 3.5  | 13.3  | 6.7  | 18.7  | 14.6                 | 32.0        |
| SE       | 3.4           | 1.1  | 4.2   | 2.1  | 5.9   | 4.6                  | 10.1        |
| CV       | 0.5           | 0.6  | 0.5   | 0.7  | 0.5   | 0.5                  | 0.5         |

Species : *Dendroclamus membranaceus*

|    |    |    |    |    |    |    |    |
|----|----|----|----|----|----|----|----|
| 1  | 30 | 11 | 41 | 5  | 46 | 3  | 49 |
| 2  | 37 | 11 | 48 | 20 | 68 | 10 | 78 |
| 3  | 21 | 4  | 25 | 13 | 38 | 21 | 59 |
| 4  | 15 | 9  | 24 | 10 | 34 | 29 | 63 |
| 5  | 16 | 5  | 21 | 7  | 28 | 12 | 40 |
| 6  | 27 | 6  | 33 | 11 | 44 | 15 | 59 |
| 7  | 16 | 5  | 21 | 4  | 25 | 7  | 32 |
| 8  | 17 | 8  | 25 | 8  | 33 | 24 | 57 |
| 9  | 19 | 10 | 29 | 13 | 42 | 34 | 76 |
| 10 | 35 | 6  | 41 | 10 | 51 | 11 | 62 |

Contd...

| 1       | 2    | 3   | 4    | 5    | 6    | 7    | 8    |
|---------|------|-----|------|------|------|------|------|
| Average | 23.3 | 7.5 | 30.8 | 10.1 | 40.9 | 16.6 | 57.5 |
| SD      | 8.3  | 2.6 | 9.5  | 4.6  | 12.5 | 10.0 | 14.3 |
| SE      | 2.6  | 0.8 | 3.0  | 1.5  | 4.0  | 3.2  | 4.5  |
| CV      | 0.4  | 0.4 | 0.3  | 0.5  | 0.3  | 0.6  | 0.2  |

Species : *Dendroclamus strictus*

|         |      |     |      |     |      |      |      |
|---------|------|-----|------|-----|------|------|------|
| 1       | 20   | 11  | 31   | 15  | 46   | 10   | 56   |
| 2       | 32   | 12  | 44   | 14  | 58   | 7    | 65   |
| 3       | 30   | 10  | 40   | 15  | 55   | 3    | 58   |
| 4       | 26   | 8   | 34   | 9   | 43   | 29   | 72   |
| 5       | 13   | 9   | 22   | 9   | 31   | 16   | 47   |
| 6       | 16   | 8   | 24   | 7   | 31   | 9    | 40   |
| 7       | 32   | 3   | 35   | 4   | 39   | 5    | 44   |
| 8       | 21   | 4   | 25   | 5   | 30   | 5    | 35   |
| 9       | 13   | 6   | 19   | 7   | 26   | 19   | 45   |
| 10      | 30   | 6   | 36   | 6   | 42   | 11   | 53   |
| Average | 23.3 | 7.7 | 31.0 | 9.1 | 40.1 | 11.4 | 51.5 |
| SD      | 7.7  | 2.9 | 8.2  | 4.1 | 10.8 | 7.9  | 11.5 |
| SE      | 2.4  | 0.9 | 2.6  | 1.3 | 3.4  | 2.5  | 3.6  |
| CV      | 0.3  | 0.4 | 0.3  | 0.5 | 0.3  | 0.7  | 0.2  |

### SUMMARY

The present paper reports on establishment of Bambusetum, Germplasm banks and Culm production studies at JK Paper Limited, Jaykaypur, Rayagada (Orissa) and supplying it to the farmers, State Forest Department, Government and Non-Government Organizations etc. These techniques could be beneficially utilized for *ex-situ* conservation of desirable genotypes in establishment of gene banks and also rejuvenation of these species.

**Key words :** Bambusetum, Jaykaypur, Conservation, Research & Germplasm Banks, Development.

बांस संरक्षण तथा जे०के० कागज लि० में बांस वन की स्थापना

ए०के० शारदा, एस०के० वर्मा व सी० महाराणा

सारांश

इस अभिपत्र में जे०के० कागज लि० जयकपुर, रायगडा, उड़ीसा में स्थापित किए गए बांस वन, बीज प्रसर

संचयन और वहां किए गए सन्धिस्तम्भ, उत्पत्ति अध्ययन तथा किसानों, राज्य वन विभागों, सरकारी और गैर-सरकारी संगठनों आदि को उन्हें दिये जाने का विवरण दिया गया है। ये विधियां इनके मूलस्थान से बाहर के स्थानों में वांछनीय समपित्रैकों के जीन संचय स्थापित करने और इन जातियों का पुनर्जीवित करने के लिए भी सलाह उपयोग में लाई जा सकती है।

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