

NEW TECHNICAL PROGRAMME

Department of Forest Products and Utilization Experiment No. 21.5.3.11

01.	Experiment No. and Title	:	Assessment of physical and mechanical properties of different bamboo species
02.	Budget Head	:	352/12029
03.	Collaborative department, if any	:	Department of Silviculture and Agroforestry
04.	Background information	:	
	<p>Bamboo is one of the oldest building materials used by mankind in tropical and subtropical regions. It meets the need of common people, helps in uplifting the poverty of local people due to its multipurpose uses. It is a suitable species for plantations and now it is also explored for agroforestry and farm forestry and generally utilized for domestic household products, pulp and paper, furniture and structural purposes in construction sectors. <i>Dendrocalamus strictus</i> and <i>Bambusa bambos</i> are the common bamboo species which have been widely studied in India for various end applications. Limited studies have been carried out on many other bamboo species for strength quality in India and especially in Gujarat. Therefore, an investigation on the physical and mechanical properties of different bamboo species planted in Bambusetum of College of Forestry is required to know their mechanical strength for various end applications.</p>		
	Hypothesis	:	It was assumed that there is no variation in the physical properties and mechanical strength of different bamboo species
05.	Objectives	:	1. To study the physical properties variation in different bamboo species 2. To study the mechanical strength of different bamboo species
06.	Principal investigator and associates	:	PI: Dr. Satish Kumar Sinha, Assoc. Prof. (WST) Co-PI: Dr. Jayesh Pathak, Assoc. Prof. (Agroforestry) Dr. Santosh A Huse, Assoc. Prof. (TI) Research Fellows: Mr. Jayendra R. Chavda, SRF Mr. Dharamshi H. Prajapati, RA
07.	Location and Agro-climatic sub-region	:	Bambusetum of NAU campus-South Gujarat Heavy rainfall zone-1 (AES-III)
08.	Year and Season	:	2025
09.	Crop and Variety	:	Four years old 20 accessions of bamboo
10.	Experimental details	:	

(a)	Treatments	:	<p>T1: <i>Dendrocalamus longispathus</i> (Kurz) Kurz (Long-sheath bamboo), T2: <i>Dendrocalamus brandisii</i> (Munro) Kurz (Velvet leaf bamboo) T3: <i>Dendrocalamus sikkimensis</i> Gamble ex Oliv. (Bhalu bans) T4: <i>Dendrocalamus giganteus</i> Munro (Giant bamboo) T5: <i>Dendrocalamus strictus</i> (Roxb.) Nees (Manvel bamboo) T6: <i>Dendrocalamus hamiltonii</i> Gamble (Choya bans), T7: <i>Dendrocalamus stocksii</i> Munro. (Goagiri bamboo) T8: <i>Melocanna baccifera</i> (Roxb.) Kurz (Berry bamboo) T9: <i>Schizostachyum pergracile</i> (Munro) R.B. Majumdar (Tinwa bamboo) T10: <i>Schizostachyum dulloa</i> (Gamble) R.B. Majumdar (Dulu bamboo) T11: <i>Bambusa vulgaris</i> Schrad. var. <i>vulgaris</i> (Common bamboo) T12: <i>Bambusa pallida</i> Munro (Kalinga bans) T13: <i>Bambusa balcooa</i> Roxb. (Boro bans) T14: <i>Bambusa nutans</i> Wall. ex Munro (Nodding bamboo) T15: <i>Bambusa bambos</i> (L.) Voss (Thorny bamboo) T16: <i>Bambusa polymorpha</i> Munro. (Burmese bamboo) T17: <i>Guadua angustifolia</i> Kunth (Guadua bamboo) T18: <i>Thyrsostachys oliveri</i> Gamble (Lathi mula bans) T19: <i>Oxytenanthera parvifolia</i> Brandis ex Gamble (Pahari Jati Bans) T20: <i>Gigantochloa atrovioleacea</i> Widjaja (Java black bamboo)</p>		
(b)	Experimental Design	:	CRD		
(c)	Replications	:	03		
(d)	Plot size (if applicable)	:	Gross	-	_____ m x _____ m NA
			Net	-	_____ m x _____ m
(e)	Spacing	:	NA		
(f)	Seed rate (kg/ha)	:	NA		

	(g) Manures and fertilizer	:	NA
	(h) Any other detail, if required	:	NA
11.	Observations to be recorded	:	<ul style="list-style-type: none"> • Culm height (m) • Culm diameter (cm) • Moisture content (%) • Basic density (g/cm³) • Shrinkage along diameter (%) • Shrinkage along wall thickness (%) • Shrinkage along length (%) • Volumetric Shrinkage (%) • Static Bending Strength (N/mm²) <ul style="list-style-type: none"> a) The ultimate strength (MOR) b) The modulus of elasticity (MOE) • Compressive Strength Parallel to Grain (N/mm²) • Tensile Strength Parallel to Grain (N/mm²)
13.	Methodology	:	<ul style="list-style-type: none"> • Samples of bamboo species will be collected from the middle portion of the entire bamboo culm of each species. Minimum 3 culms will be selected from 3 different clumps of each bamboo species for the assessment of physical and mechanical properties. • Physical properties of bamboo: Moisture content, basic density and shrinkage will be determined from the cross-section of bamboo internodes. • Mechanical properties The selected samples, free from defects like cracks and crookedness will be air-dried and conditioned and tested in a computerized Universal Testing Machine (UTM) of 5 tons loading capacity capable of measuring load to the nearest 100N and deflection to the nearest 1mm for determination of static bending strength, compressive strength parallel to grain and tensile strength parallel to grain