Table 2. Yield of banana and WUE

Treatment	Bunch yield (t/ha)		Irrigation water (m^3/ha)		WUE (kg/m^3/ha)	
	I crop	II crop	I crop	II crop	I crop	II crop
T1	50.54	51.85	25497	22500	1.98	1.97
T2	55.09	57.25	30811	31206	1.79	1.63
T3	52.07	48.22	23108	23404	2.25	1.77
T4	49.55	49.38	15405	15603	3.22	2.54
T5	25.11	22.53	8962	7801	2.80	1.93
SEd	1.80	3.24				
CD	390	7.06				

In both the crops, the treatment T2 (32 l/day/tree) drip irrigation recorded increased yield. In the first crop, the treatment T2 and T3 were similar. However, in the second crop, the treatments T1 and T2 were on par. The treatment T5 (8 l/day/tree) drip irrigation recorded the lowest yield in both the crops. The WUE was the highest in the treatment T4 (16 l/day/tree) drip irrigation in both the crops. Cevik *et al.* (1988) also found that drip irrigation system saved 50 per cent in water use over basin irrigation system and the yield of drip irrigation plants was also higher.

As on overall picture, the optimum quantity for drip irrigation may be 16 l/day/tree. Hence, from the water management point of view, banana has to be irrigated by drip irrigation at the rate of 16 l/day/tree.

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STUDIES ON DESERT TEAK SEEDS

M.S.NIRMALA and J.RADHAKRISHNAN
Regional Research Station, Tamil Nadu Agricultural University, Kovilangulam 627 107

ABSTRACT

Investigations were carried out in the pods and seeds of desert teak, *Tecomella undulata* at the Regional Research Station, Kovilangulam, to study the pod morphological characters and to assess the stage of pod harvest for seed collection. Colour change of pod from yellow to brown can be taken as a reliable index for pod harvest. Fresh seeds are readily germinable and seeds from apical and middle region possess high seedling vigour compared to distal region.

Tecoma undulata G.Don or *Tecomella undulata* (Fam:Bignoniaceae), a native of Indian peninsula is an ornamental flowering tree suited to dry localities. It is common in desert areas of Haryana, Rajasthan and Gujarat. It is good for shrubbery. Extensively planted as an avenue tree on roadside and also in parks in North West regions where it makes a fine display of its orange yellow flowers in March. Prized for furniture and being drought hardy and fire resistant, it is useful for afforestation and land scaping of dry tracts (Randhawa, 1983). Introduced as an avenue tree in the Regional Research Station, Kovilangulam, it is gaining more importance in the social forestry programme. Since seed is the major propagule,

nurserymen needs technology on seeds for supply of good and highly vigorous seedlings to farmers.

Bonner (1970) pointed out the pit falls in hard wood seed collection and handling, emphasised the importance of timing by applying the various seed marutity indices. Barton (1961) conducted experiments with variety of crop seeds and showed that loss of viability or seedling vigour hastened as seed moisture content and temperature increases during storage. Loss in germination and vigour of seeds due to ageing is inevitable under normal storage conditions. Hence, preliminary studies were carried out at the Regional Research Station, Kovilangulam to study the pod and seed morphology, the time of pod harvest for seed collection and the germination and vigour of fresh and old seeds.

MATERIALS AND METHODS

Pods collected from the trees at the Regional Research Station formed the material for the study. The pod and seed morphology / physical characters *viz.*, colour, weight and size, were evaluated as per the recommended procedures. The germination and vigour of seedlings were also tested. The vigour index was calculated using the following formula and expressed as whole number.

Vigour index = Germination per cent X Total Mean length of seedling in cm.

RESULTS AND DISCUSSION

Description of pod and seed

Dried pods are dark brown in colour slightly curved and attached individually to the dropping branches. The breadth of the pod is uniform except at apical and distal ends. The distal portion ends with a beak like structure. The pod dehisces longitudinally into two equal parts. A central region called replum (central core) separates the pod invididually into two equal portions. The replum is flat dark brown in colour slightly sticky in nature in moist condition. Seeds are embeded on the replum in rows of 4 to 6 layers. The replum constitutes about 30-40% of pods whole weight. The dried pods ruptures along this replum and the seeds are dispersed by wind.

The seeds are light brown in colour with feathery appendages in the outer layer. The embryo is covered with a papery inner cover. The embryo is attached basally in the seed. The fresh weight of dry pods varied from 4 to 9.3 gms. The length and breadth (brown colour) of pods varied from 25.7 to 33.4 cm and 0.9 to 1.2 cm respectively weight of seeds per pod ranges from 1.13 to 2.23 gm. Total number of seeds per pod varied from 165 to 260 with 70-81 per cent of good seeds. Working on the harvestable maturity, Tekrony *et al.*, (1980) defined it as the time taken for the drying of seed to a moisture content of 14 per cent or less. Crossley (1953) reported that colour change of seed coat from light brown to dark brown or black was offered as reliable index of maturity. In the present study, it is evident (Table 1) that drying process proceeds from the distal to the apical region of pod. The data further revealed that loss in moisture content associated with colour change of pod i.e from yellow to brown can be taken as a reliable stage (index) for harvesting the pods. Further delay in harvesting may result in dehiscence of pods and seed collection becomes difficult. According to Bonner (1976) the best index of maturity for yellow poplar seed is the color change of fruits from light green to yellow green. Moisture content of seed progressively decreased from an initial level of 90 per cent approximate to 50 to 60 per cent at maturity (Andrews, 1966) Cerl and Snow (1971) and Gawande (1985) reported that decline in moisture content was rapid towards the end of the ripening period. In this study, the moisture content

Table 1. Assessment of harvesting stage of desert teak pods

	Fresh wt.		Dry wt.		Moisture content per cent		Germination per cent	
	Y	B	Y	B	Y	B	Y	B
A	11.7	4.3	3.12	2.4	73.5	44.1	86	96
M	12.3	4.65	3.9	2.1	68.29	36.72	89	93
D	8.60	3.00	2.6	2.15	46.5	28.33	82	85
SEd	0.176	0.169			0.266		1.25	
CD	0.518		0.32		0.783		4.60	

Table 2. Germination and vigour of fresh and old seeds

Parameters	Undivided and Ungraded	Fresh Pods			Undivided and Ungraded	Old Pods		
		A	M	D		B	M	D
Germination (%)	62	95	97	83	41	56	62	48
Root length (cm)	61	7.6	8.4	5.3	5.7	6.4	6.8	4.1
Shoot length (cm)	4.6	5.5	6.3	4.0	3.6	4.7	6.2	3.2
Drymatter production (mg/10 seedling)	8.4	15.3	17.4	10.2	8.2	11.6	12.5	8.0
Vigour index	663.4	12.44	14.25	771	381	621	806	359

Y - Yellow Colour Pod B - Brown Colour Pod A - Apical region M - Middle region D - Distal region

of desert teak pods decline from apical to distal regions of pod and the gradual decrease in moisture content of pods is noticed as the drying process proceeds. Harvesting the pods at yellow to brown colour stage of pod is very important for collection of seed with good seedling vigour.

The problem of ill filled seeds can be solved by proper cleaning and grading. The fresh and good seed with embryo is readily germinable and has recorded higher germination per cent compared to old and ungraded seeds (Table 2). Rao *et al.*, (1982) found in variety of crop seeds that germination per cent dropped from the initial level of 50 per cent to zero per cent under storage in ambient condition. The loss of viability due to ageing is a natural process and it can be controlled by monitoring the storage environment and management of seeds.

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EFFECT OF FUSED CALCIUM SALTS ON POST HARVEST PRESERVATION IN FRUITS

G.PATHMANABAN, M.NAGARAJAN, K.MANIAN and K.ANNAMALAINATHAN

Department of Crop Physiology, Tamil Nadu Agricultural University, Coimbatore 641 003

ABSTRACT

The exposure of fruits to fused $CaCl_2$ or fused $CaCO_3$ in closed poly bags retarded the ripening, peel colour development and textural softening. The shelf life of the fruits exposed to fused $CaCl_2$ or $CaCO_3$ was extended by more than 10 - 12 days. The moisture loss was higher in untreated fruits during the period of storage whereas only minimum water loss was observed in treated fruits. An organoleptic evaluation indicated improvement in consumer satisfaction of $CaCl_2$ or $CaCO_3$ exposed fruits.

Post harvest losses in fruits are quite considerable to the extent of 50 to 70 per cent. Harvest injuries, lack of efficient storage facilities and diseases cause heavy losses. Shrivelling due to

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