

Identification of elite mother palms for seedling production in root (wilt) affected areas of Onattukara

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In a crop like coconut which has long prebearing period and which takes long time to attain yield stability one must be vigilant about the selection procedure while selecting a mother palm for seedling production.

A random survey was conducted for the identification of mother palms in the selected panchayaths of Onattukara in Alappuzha district in Kerala during July 2004 in the project entitled "Survey and identification of root (wilt) disease free palms and evolution of tolerant genotypes in coconut through selection and hybridization." The project was funded by the Coconut Development Board.

Based on the extent of damage and nature of disease, root (wilt) is considered to be a major disease occurring in Kerala. The disease was prevalent in more or less contiguous areas in 4,10,000 ha in eight southern district in Kerala. The intensity of both bearing and non bearing palms was highest in Kottayam district (75.6%) followed by Alappuzha (70.7%) (P.K.Koshy, 1999). Now Onattukara Panchayat is one of the heavily diseased areas in Alapuzha district. So it is very important to identify highly tolerant genotypes. This type of high yielding and highly tolerant genotypes of coconut palms are the elite palms. An improved variety of coconut should be regular in bearing producing an average of 80 nuts per

year with copra content of 180 gram under rain fed conditions (Thampan, 2000).

The survey was mainly concentrated in West Coast Tall (WCT) type coconut palms of more than twenty years, with a regular bearing habit and robust in appearance in the root (wilt) affected hot spot areas. Flaccidity, yellowing and necrosis of margins of leaflets of the leaves of central and outer whorls is considered to be a typical foliar symptom of root (wilt) [Varghese, 1934; Menon and Nair, 1952; Menon and Pandalai, (1958). Phytoplasma has been established as the causal organism of the disease. Lacebug (*Stephanitis typicus*) and plant hopper (*Proutista moesta*) are the proven vectors of the disease. (Solomon, 1991)

The identification of elite mother palms for the production of super quality seedlings are carried out in hot spot areas of root (wilt) disease. The following characters were evaluated for the selection of mother palms.

1. YIELD:

The mother palm should be regular bearer and should give annual

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yield of greater than 80 nuts and the copra content should not be less than 150 gram per nut under rain fed condition. The palm should have all typical characters of WCT palms. The palm should have regular yield and bunches should rest on petiole.

2. Age:

Age of the palm should be 20 years or more. Avoid old palms above sixty years.

3. Reaction to biotic stress:

Eighty percentage or more surrounding palms should be diseased, preferably in the advanced stage of disease. The palm should be comparatively free from all disease and pest. So seedlings, obtained from the seeds of this elite palms show high tolerance to almost all stress conditions especially root wilt.

4. Serological test:

The etiology of the disease now conclusively been established as phytoplasma (Solomon and Govindankutty, 1991). For large scale screening of coconut samples antigen coated indirect ELISA (Enzyme Linked Immunosorbent Assay) protocol (Voller et al., 1977) has been standardized with slight modifications. Root (wilt) antibody is used as direct antibody and crude extract of tender leaves as test antigen. ELISA is more sensitive and rapid diagnostic test has been standardized for the quick detection of root (wilt) disease. The selected palms should react negatively to the serodiagnostic test ELISA.

5. There must be more than 30 fully opened leaves with short strong petiole and wide leaf base firmly attached to the stem.

6. The palm should have at least 12 bunches of nuts with strong bunch stalks, bearing nuts of medium size and oblong shape. Husked nuts should weigh not less than 600 grams

Survey for the elite mother palms from farmers fields

During May 04 and November 04 detailed surveys were carried out in Alappuzha, Pathanamthitta, Kottayam and Kollam districts and preliminarily 573 elite mother palms (WCT) were selected from the farmers' field.

Out of the 573 selected palms, 293 elite palms from Alappuzha district, 256 palms from Kollam district and 24 from Pathanamthitta district were collected (table 1). It was observed that 17% of palms were under the age of 20-30 years, where as 55% were of 30-50 years and 28% of 50 and above years.

The survey also revealed that the shape of crown in WCT palms may vary. The crown appearance can be of spherical, semi-spherical and X-shaped. In spherical canopy, the

Table 1. Preliminarily selected elite mother palms from farmers' field

Districts	Name of Panchayat/Municipality	No of mother palms selected
Alappuzha	Bharanikavu	53
	Vallikunam	130
	Kayamkulam	73
	Thekkekara	26
	Chettikulangara	6
	Pathiyoor	5
Kollam	Adhichanelloor	101
	Chattanoor	74
	Kadavoor	33
	Eravipuram	15
	Myyanaad	9
	Klappana	16
	Oachira	8
	TOTAL	573
Pathanamthitta	Thiruvalla	14
	Kadapra	4
	Niranam	2
	Thalavady	4

The steps involved for raising of elite seedling:

1. Selection of elite mother palms from farmers field.
2. ELISA testing of mother palms.
3. Seednut collection from the elite mother palms and storing them.
4. Raising nursery by sowing the elite seednuts.
5. Selection of good quality seedling based on early germination, rapid growth and seedling vigour.

leaves are closely arranged and bunches are not seen since they rest on the petiole (Fig1). In semi-spherical, the canopy resembles a half-circle. When observed from below, the petiole of the leaves seems to be arranged in a circular manner (Fig 2). The X shaped canopy resembles the cross symbol. Here the bottom half of the leaves along with bunch are drooping and the other half stands upright. (Fig.3).

After the selection of elite mother palms, they will be subsequently

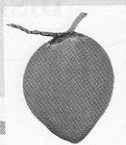


Fig. 1

subjected to ELISA test and the negative mother palms were taken for seed nut collection programme. Using the ELISA test diseased nature of the palms selected could be detected as 6 to 24 months before appearance of visual symptoms. The presence or absence of phytoplasma in these palm were confirmed by this test.

The seedlings procured from root

Table 2. Number of elite mother palms selected by ELISA test

Year	ELISA tested palms	Negative (healthy)	Positive (Diseased)
Second year	116	65	51
Third year	112	81	31
Fourth year	50	43	7

Table 3. Seednut collection and elite seedling programme

Year	No. of seed nut collected	No. of elite seedlings produced
2004 - 2005 (first year)	5807	4330
2005 -2006 (second year)	10141	6592
2006 -2007 (third year)	9596	5960
2007 -2008 (fourth year)	8090	5395

(wilt) free area will not perform well in Alappuzha, Kollam, and Pathanamthitta districts. So availability of superior and healthy coconut seedlings from hot spot areas will be helpful for the up gradation of coconut plantation of this region. The seedlings produced from this programme is expected to have cumulative tolerance to almost all stress conditions especially root (wilt). Planting of seedlings from highly resistant mother palms can enhance the production of coconut plantation of the region in respect of



Fig. 3

sustainable performance for yield and tolerance to stress condition.

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Fig. 2

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DISHES WITH COCONUT

VEGETABLE PULAO

Ingredients:

Basmati rice	- 450 gms
Coconut milk	- 2 cups
Moong dal	- 115 gms
Coriander leaves	- one small bunch
Ginger	- one inch piece
Red chillies	- 4
Green chillies	- 4
Garlic	- 4 pods
Garam masala	- one tbsp
Turmeric powder	- half tsp
Onions cut into thin rings	- 115 gms
Essence of saffron	- ¼ tsp
Lime	- half piece
Mixed vegetables (cauliflower, carrots, peas, potatoes, French beans etc)	- 450 gms
salt to taste	
Fried cashew nuts	- 100 gms
Coconut	- one

Method : Cut vegetables into small pieces. Wash and soak the rice and dal for one hour. Drain and half boil both of them separately. Drain and set aside. Fry the onion rings until golden. Grind ginger, chillies, coriander and garlic to a fine paste. Heat 3 tbsp ghee or cooking oil and fry all the uncooked vegetables for 5 minutes. Add the ground paste, garam masala, turmeric and salt. Cover tightly and leave until the vegetables are half cooked. Blend coconut milk. Lime juice and a little saffron essence. Fry the coconut to a golden colour and slice finely. Take a large greased vessel and arrange rice, dal, onions and vegetables in layers. Start and finish with a layer of rice and cook over a very low flame until the rice is tender and dry.

CAULIFLOWER CURRY

Ingredients:

Onion, chopped	- 100 gms
Green chillies, sliced	- 5
Ginger -garlic paste	- one tsp
Curd	- one cup

Oil	- for frying
Salt	- to taste
Cauliflower	- 50 gm
Grated coconut	- 25 gm
Khus khus	- 25 gm
Garam masala	- 50 gm
Tomatoes, chopped	- 3
Chilli powder	- half tsp
Coriander leaves, chopped	- few

Method: Heat oil in a frying pan and fry the cauliflower until golden in colour. Keep aside. Heat 50 gm oil in the same pan and fry the onions until golden brown in colour. Also add ginger-garlic paste and fry for few minutes. Mix grated coconut, khus khus and blend to a fine paste. Add on mixture and fry for a few more minutes. Then add chilli powder and green chillies. Fry this mixture for another 2 minutes. Later add chopped tomatoes, curd, salt and cook for 5 more minutes. A thick gravy appears. To this, add the above fried cauliflower and cook for 2 more minutes. Remove from fire, serve with vegetable pulao.

SWEET AND SOUR CHANA DAL

Ingredients:

Chana dal	- 300 gm
Mustard seeds	- 1 tsp
Fenugreek seeds	- 1 tsp
Ani seeds	- 1 tsp
Turmeric powder	- one tsp
Sugar	- one tsp
Raisins	- 2 tbsp
Oil	- 4 tbsp
Salt	- to taste
Red chillies	- 5
Bay leaves	- 2
Coconut sliced into 2 cm long pieces	- half cup

Method: Soak the dal for 4 hours in water. Pressure cook till soft. Add turmeric, salt, sugar and keep aside. Heat oil. Add mustard seeds, bay leaves, coconut pieces and raisins. Fry gently till golden. Pour the cooked dal into fried masala. Add enough water to cook and make into a thick gravy. Serve with puri, chapathi etc.

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