Short Scientific Report

doi: 10.25081/jpc.2018.v46.i2.3730
Journal of Plantation Crops, 2018, 46(2): 147-150

Studies on suitability of existing climbing devices for palmyrah palm (*Borassus flabellifer* L.)

P.C. Vengaiah, G.N. Murthy and H.P. Maheswarappa

AICRP on Palms, Horticultural Research Station, Dr. Y.S.R. Horticultural University, Pandirimamidi- 533288, Andhra Pradesh, India

(Manuscript Received: 04-05-18, Revised: 03-07-18, Accepted: 12-07-18)

Keywords: Climbers, efficiency, safety, Palmyrah palm

Palmyrah (*Borassus flabellifer* L.) is an important tree crop in coastal and dry land and high altitude areas of southern India and is used as food and income source of tribal and rural people. This tropical palm grows in India, Sri Lanka, Malaysia, the Philippines, Indonesia and many parts of East Africa. It is found throughout India, prominently grown in Kerala, Andhra Pradesh, Orissa, Bengal, Bihar and along the entire west coast. Palmyrah, which generally grows in the wild, can be easily cultivated. This crop plays an important role in the day-to-day life of the poor and landless farmers. In India, nearly 122 million palms are growing and Tamil Nadu occupies first place followed by Andhra Pradesh. Due to its multifarious uses, the palm is equated to the "Kalpa Vriksha" (Sankaralingam *et al.,* 1999). At present, lack of skilled manpower to climb the palm is a major constrain for the effective utilisation of palmyrah. Among the climbing machines developed, standing type or manually operated paddle type (tree walker) and sitting type or push up type (multi tree climber) are the two models available commercially. The tree walker was designed initially for coconut palm (Kolhe, 2010). Here, studies were taken up to evaluate the suitability of climbing devices for palmyrah palm climbing.

Palmyrah palm, due to its height, is very difficult to climb manually. At present, very few people climb on palms due to high risk and only professional climbers are being utilised for harvesting (Dushyant *et al*., 2012). The study was taken up to assess the performance and suitability of climbers developed for palmyrah palm climbing.

Manual climbing

Manual climbing is the common method adopted to climb on palms which involves high risk and a tiresome process. Tappers must climb each tree at least twice per day (Fig. 3), once in the morning and once in the evening - if they fail to undertake this daily operation, the cut portion of the spathe will heal and then they have to wait 15 days for another spathe. Each tapper is given 40-50 trees for harvesting; some of the trees have a height around 90 feet or more.

Available climbing devices

Standing type or manually operated paddle type ('Tree Walker')

In this model, the user has to stand and operate the device. Initially, the steel rope wires of both top and bottom assembly has to be looped with the tree and has to be locked. Then the user can stand by placing foot on both assemblies. As the user lifts the assembly by foot, the steel rope will get loosen and when pushbacks with foot it will get tighten. By this process the user can easily climb on trees without much effort compared to manual climbing.

**Corresponding Author: pcvengaiah@gmail.com*

For the downward movement, the user has to loosen the loop by raising his leg and pulling the handle, then he has to move down the device to a particular distance. From there the loop has to be tightened by pushing the leg towards down. For easy climbing, the body posture has to be kept straight (Fig.1).

Fig. 1. Standing type or manually operated paddle type (tree walker)

Sitting type or push up type ('Multi tree climber')

This type consists of two stainless steel frames with adjustable arrangement as per girth size by pinion arrangement (Fig. 2). The top frame has a provision for seating. The weight of the equipment is more as compared to standing type as the frame along with sitting is provided. After that the user can stand by placing the foot on bottom frame and frame can be adjusted for tightening or loosening and lift with foots while sitting on the top frame. The adjustable safety belt will support the user and will reduce the back pain while climbing (Fig. 4).

The study was conducted in the palmyrah field of Horticultural Research Station, Pandirimamidi,

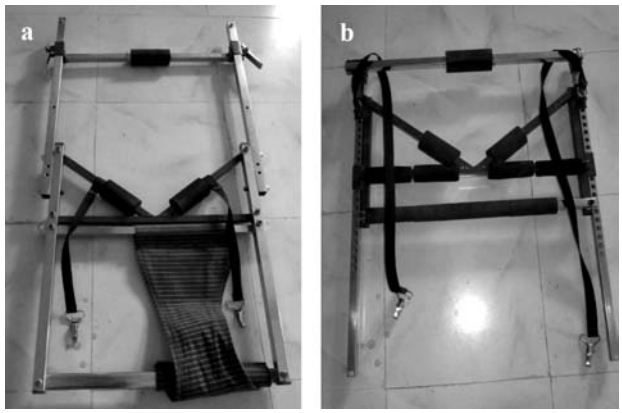

Fig. 2. Sitting type or push up type a) top frame b) bottom fame

Andhra Pradesh with existing climbing machines as well as traditional climbers. The climbing machines of standing type and sitting types were procured from the suppliers, Tamil Nadu and evaluated. Data were collected from three climbing methods *ie.*, manual climbing, standing type and sitting type.

The following parameters were observed while climbing both up and down:

a. Weight of the person and machine

b. Heartbeat before and after climbing

c. Time for climbing

d. Remarks of the climber

e. Cost of the machine

The data collected in triplicate and average values taken for four climbers.

Weight of the person and machine: The average weight of the person (M1) was 58 kg, weight of the machine standing type (M2) was 7.1 kg and sitting type (M3) was 9.3 kg.

Heartbeat before and after climbing: Heartbeat of person was observed before climbing to be 72-80 per minute and it was normal. The heartbeat of the person after climbing without machine was 89-92 per minute, the heartbeat in climbing with standing type model was 82-83 per minute and the heartbeat was 81-82 per minute while using the sitting model machine.

Table 1. Parameters tested before and after climbing the tree manually and using machines

Climber	Weight of the machine (kg)	Heartbeat before climbing (min)	Heartbeat after climbing (min)	Time for climbing (s) up/down	Cost of the machine (₹)
Manual	0.0	72-80	89-92	21/23	400
Standing type	7.1	72-80	82-83	42/40	3600
Sitting type	9.3	72-80	81-82	49/52	7400

Time for up and down climbing: Average time taken for climbing without machine was found to be 21 seconds for climbing up and 23 seconds for coming down the palm of height 32 feet. For the same height, climbing with tree walker took 42 seconds for climbing up and 40 seconds for coming down excluding machine fixing time, while 49 seconds for climbing up and 52 seconds for coming down the sitting type machine after arranging the machine on the tree.

Remarks of the climber: A skilled climbing person felt that the machine was heavy and ensured safety as compared to be traditional method, but semi skilled and unskilled officials felt that the machinery was quite suitable and it will boost the utilisation palms more effectively.

Cost of the machine: The standing type model (tree walker) costs ₹ 3600/- and sitting type multi tree climber costs ₹ 7400/- and maintenance of the machine is very less and easy to handle and carrying; where as in traditional climbing, the accessories like loop and rope costs around ₹ 400/-.

Fig. 3. Traditinal climbing practise in agency area of East Godvari district

Fig. 4. Sitting type or push up type for Palmyrah

From the study it is clear that amongst the two commercially available climbing devices, manually operated paddle type or tree walker is useful and some modifications are needed as palmyrah palm girth is more, and it is the best alternative to the traditional climbing method. It has better climbing efficiency, easy to use and economically more suitable. On the other hand, Multi tree climber is very easy to learn and safe, but efficiency is very less as compared to traditional and tree walker. Commercial exploitation

of this device is difficult as its operation is time consuming, The climbers who have some experience of traditional climbing did not feel the necessity of any safety measures but new comers in this area felt the need for a safety attachment to tree walker for the safety and comfort of climbers.

References

Dushyant, S. Kushwaha, H.L. Mathew, A.C., Manoj, T.S., Hebbar, K.B. Madhavan, K. George, V.T. and Bhargav, V.K. 2012. Performance evaluation of paddle type and push up type coconut climbing devices. *Journal of Plantation Crops* **40**(3): 224-226.

Kolhe, K.P. 2010. Mechanized harvesting, the need of coconut growers in India. *Indian Coconut Journal* **73**(2): 15-19.

Sankaralingam, A., Hemalatha, G. and Ali, A.M. 1999. *A Treatise on Palmyrah.* ICAR, All India Co-ordinated Research Project (Palms), Killikulam, Tamil Nadu and Central Plantation Crop Research Institute, Kasaragod, Kerala, India.