

HANDLING AND DELIVERY OF *HEVEA BRASILIENSIS* (PARA RUBBER) BUDDED STUMPS FOR PLANTATION ESTABLISHMENT IN NIGERIA

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ABSTRACT: *Hevea brasiliensis* is a low-land tropical tree crop and can be propagated by sexual as well as asexual methods in the nursery. Seedlings (budded stumps) or planting materials so produced are carefully extracted and conveyed to the designated locations where they are eventually planted. This involves a number of activities which are here discussed along with necessary precautionary measures to ensure high survival of the field transplants.

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INTRODUCTION

Rubber (*Hevea brasiliensis*) is a low-land tropical tree crop which can be propagated by generative and vegetative means (RRII, 2000). Raising of young rubber plants is usually carried out in the nursery (because of its associated advantages) where they undergo necessary biotechnological and physiological manipulations (Edington, 1991). In order to achieve optimum growth and development, pre-germinated seeds are sown directly into the ground after necessary land preparation or in polythene bags containing well formulated potting mixtures. The vulnerability of rubber seedlings and the need to develop planting materials which are true-to-type (budded stumps) in terms of clonal specification, necessitate a systematic deployment of specialized skills. This skill involves the replacement of the patch of the bark of the seedling plant (stock) with a patch of the bark with dominant bud (bud patch) taken from the genotype to be multiplied (scion). This preserves the genetic constitution of the desired genotypes from one generation to the next (Giroh *et al*, 2010, Idoko *et al*, 2007, Delabarre and Serier, 2000; Marattukalam and Sarawathymma, 1992). This process is very technical and the planting materials so produced are very delicate materials. Hence, only a few governmental and non-governmental agencies such as the Rubber Research Institute of Nigeria (RRIN) that has the national mandate for the crop improvement and cultivation is actively involved in the production of *Hevea* planting material; thereby serving as the only major sources of planting materials in Nigeria (Uriah and Omokhafa, 2001).

In Nigeria, a high proportion of rubber farms are owned by small holders and these farms are situated very far away from RRIN, the planting materials production site. This is also true for most rubber

producing countries of the world (IRRDB, 2007). Consequently, *hevea* planting materials have to be transported over long distances to farm sites where they are needed for plantation establishment. Most of the access roads to the farms are in very poor and bad states.

The situation requires that the delicate planting materials be managed such as to reduce losses during movement from sites of production to sites of utilization. Hence the focus of this paper is proper handling and delivery of *Hevea* planting materials to ensure optimum survival and performance.

Lifting and dressing of seedlings

Lifting is carried out from two weeks after budding success has been certified. Seedlings to be lifted are cut back at about 4cm above the bud-scion union to form stumps. The procedure for lifting *hevea* seedlings in the nursery depends on the growth medium in which they were raised. In the ground nursery, soil around the root area is first loosened up by careful digging (with a dibbler or digger). This also provides easy access to the tap root which is then pruned (with a hand saw or secateurs) at about 9cm from the base. Further pruning is carried out to remove the side roots until the budded stump becomes more or less naked. Openings created as a result of the pruning are smeared with clay slurry or wax to prevent excessive loss of moisture through them. The budded stumps are then stacked in batches of 200 or less, watered and covered with vegetative materials in preparation for loading. Care should be taken to prevent the budded stumps from rubbing against each other in order to minimise abrasive action on the budded portions.

In the polythene bag nursery, the potted seedlings are simply cut back and moved along with

their growing medium. Parts of the roots that grow out of the polythene bags are pruned off to break anchorage with the soil and create a neat package. Watering is necessary to stabilise the soil and minimise shock.

Lifting is most appropriately done in the mornings, evenings or during cloudy conditions, when evapo-transpiration is minimal.

Loading

Planting materials could be conveyed with bicycles, wheel barrows and automobiles; depending on the distance involved and the form in which the materials are to be transported (i.e. whether as naked stumps or in polythene bags). Whichever conveyor is being used, it is important that the truck be parked as close as possible to the point where the planting materials have been assembled. Loading activities pre-dispose the naked budded stumps to abrasive action as they rub against each other. Care should therefore be taken to protect them particularly the bud patch surface (bud-scion union) from bruising and thumping. Before loading, the floor of the conveyor should be lined with soft vegetative materials to provide cushioning effect. The materials are then carried in convenient masses and stacked carefully in the conveyor, ensuring that distinct groups (clones) are effectively separated. After loading, the planting materials could be sprinkled sparingly with water and covered with vegetative materials, jute bags or tarpaulin to create humid condition for the transplants during delivery.

Proper care should also be taken when handling planting materials in poly bags. The materials should be conveyed with minimum disturbance to the root system; by simply preserving the ball of earth in which the budded stumps were raised. The polythene bags are arranged on the floor of the conveyor, resting side by side on each other. This is to minimize bumping and toppling on the route to delivery point. After loading, the seedlings are watered to stabilize them and to provide for potential loss of water associated with the process of transportation.

Delivery method

The planting materials are carried to destination points by the means mentioned above. The journey should commence once loading is completed. The most appropriate times for delivery are in the evening, at nights or on rainy days because these periods are associated with high relative humidity and low temperatures; thereby minimizing moisture losses in the materials.

Off-loading

The materials should be taken as close as possible to the place where they are to be used for planting. All precautions observed during loading are again strictly followed to avoid damage. If big vehicles are used, it is better to have some persons on board who will carefully pass the materials down to others on the ground. The materials should be kept under shade prior to planting and thoroughly watered to rejuvenate them from the rigours of the journey.

Storage

Storage becomes necessary when pre-planting operations have not been concluded before the arrival of the planting materials. To create a cool moist place which is most appropriate for the purpose of preserving the planting materials, natural tree shades could be harnessed. Alternatively, artificial shades could be made by constructing a network of cross-bars over vertical wooden supports and covering all over with shading materials (usually palm fronds) except at the entrance points. Once in the shade, the materials are thoroughly watered again and left undisturbed; although the naked budded-stumps could be further covered with additional palm fronds or other vegetative materials. Subsequent, but discretionary watering can continue daily until the field is ready for planting. Ideally, the land for plant should be ready before budded stumps are delivered to site.

Land preparation

Land preparation is necessary to create a suitable growing medium for the planting materials in the field and should be completed before the arrival of the materials. This is usually done around March to June. Poor preparation of land undermines the careful efforts that have been put into the production and delivery process, and therefore should be handled with seriousness. Land preparation can be done mechanically or manually. Mechanical land preparation with the use of tractor to remove unwanted vegetation is not advisable because of the following disadvantages: the machine will compact the soil so much that the roots of the transplants will be stunted. In addition the top soil will be removed during preparation leading to poor nutrient status of the soil. It will also predispose the soil to erosion. Manual land preparation is encouraged because it does not have the disadvantages of the former. Manual land preparation activities include clearing (including felling of trees), cross-cutting, packing/burning, stumping etc (Imarhiagbe, 2001).

Land preparation also involves the lining-out of the field (using the simple chain survey technique) in which planting positions are pre-determined according to the planting spacing to be adopted.

Holes of appropriate sizes are also dug to accommodate the planting materials.

Planting

The seedlings should be transplanted as soon as the field is ready. The most appropriate time for transplanting into the field is when the rains are fairly steady. This is usually from late June to early September. Planting holes are dug with hoes and spades at appropriate plantation spacing. The size of the hole depends on that of the material being transplanted. Generally, naked budded stumps require smaller hole-diameter than polythene bag budded stumps/seedlings. The materials are simply placed in the holes and vacant spaces are filled with soil. A maximum and firm soil-root contact is essential to ensure quick establishment of the materials in the soil. This can be achieved by back-filling the holes in parts and ramming repeatedly after pushing each bit of the soil inside the hole. For materials in polythene bags, the bags are first cautiously ripped-off the ball of earth by using razor blade to cut off the bottom and following up with a vertical incision to completely set it loose.

CONCLUSIONS

Precautionary measures are essential in the successful handling and establishment of Hevea planting materials. When properly observed, they can reduce accidental damage, promote optimum survival of field transplants, ensure uniform growth, minimize cost of seedling replacement etc.

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