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PROSPECTS OF PALMITO PRODUCTION FROM PEJIBAYE - REVISITED

by

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1. INTRODUCTION

Five years ago an association of the main palm heart producers known as Groupement Palmiste signed a research contract with the Mauritius Sugar Industry Research Institute (MSIRI) to screen new species for palm heart production. At the time there were about 200 hectares under palms. Production was insufficient for the domestic market mainly because of the existence of two main constraints to production. Both constraints arise out of the use of a single species, *the palmiste blanc de Maurice - Dictyosperma album* var *album*. This species grows slowly, taking between 5 and 7 years to attain harvest size. In addition, it is very susceptible to a widespread and destructive coleopterous insect pest, *Brontispa limbata*. Members of the Groupement Palmiste felt that there was much scope for increasing production if only these two constraints could be removed. Consequently, they set as objective for the joint MSIRI/Groupement Palmiste project to evaluate new species in order to select one which grows faster and is not susceptible to the insect.

The project was launched in mid 1998. One of the first activities was a mission to Brazil and Hawaii to observe what was being done there and to discuss the prospects of the different species short-listed for inclusion in the trials. The mission report entitled " prospects of palmito production from pejibaye" was presented to the Groupement Palmiste in January 1999 and circulated exclusively to the members in April 1999 (Govinden, 1999), and the first trials were planted in the field early in 1999. More trials were planted in 2000 and 2001. The first trials have been harvested, but the last ones are still in the field. Although the contract was terminated when it reached its five-year term in mid-2003, the last trials are still being followed. The final report is being prepared.

The time has now come to re-examine the conclusions of the report submitted in 1999 in light of the results of the field trials. Such is the objective of this paper.

2. EVOLUTION OF THE PALM INDUSTRY

A diagnostic survey of the palm heart production practices and problems of members of the Groupement Palmiste was conducted at the initiation of the joint research project in 1998. Since then the industry has evolved, and some of the changes may have a bearing on the future outlook and prospects of pejibaye. The evolution up to mid-2001 was collected in a mini-survey conducted among members of the Groupement Palmiste at the mid-term review of the project. The evolution to date (mid-2004) has been obtained during informal discussions with the Groupement members.

By 2001, four out of nine members had increased the area under palms while the others were pursuing as usual. More recently, in 2003 and 2004, most members have imported seeds of pejibaye for planting.

In 1998 the prospects for palms were deemed to be good and were judged to be very dependent on the future of sugar production. This dependency is due to the fact that producers saw palms as an alternative to sugar cane on marginal lands. In 2001, the prospects were still deemed to be good by five out of nine members while one felt they were worse. Since then, the sugar industry has been facing serious prospects of declining prices, and it is estimated that more land may be released from sugar production. In the mean time no other alternative crop has been proposed as a substitute. Consequently, the prospects for palms may now be even better.

In 1998, the first constraint to production by far was the long crop cycle of the species under cultivation. But, in the mid-term review of 2001, long crop cycle had become the eighth constraint, having been supplanted by theft, weeds and pests in the first, second and third place, respectively. The perception that long crop cycle was no longer a major issue may have come from members' observation of the fast growth of some species in the trials and from the preliminary results of the project. Marginality of land was not even listed among the constraints in 1998, probably because it was natural to assume that palms should be grown on marginal lands. By 2001, marginality of land was reckoned to be the fourth constraint in importance, probably because some growers had started to think of palm as an industry on its own, not necessarily

destined to be produced on marginal lands. In 1998, theft was mentioned among the less important constraints but, by 2001, it had become the most important one. Since nothing has been done at the institutional level to address the issue, theft must still be reckoned to be an important problem.

3. PROSPECTS OF PEJIBAYE - REVISITED

Three reasons were given in the 1999 paper (Govinden, 1999) to support the conclusion that the prospects of pejibaye (*Bactris gasipaes*) were good. They will now be re-examined in light of the experience gained with growing the species and of the results obtained so far in the trials.

(i) It grows very fast.

In the 1998 survey, the respondents indicated that the *palmiste blanc de Maurice* had an average crop cycle of 5.85 years with a large range varying from a mean minimum of 4.5 to a mean maximum of 7.2 years. The results of our trials so far gave an average of 5.5 years with a range of 4 to 7. The cycle was slightly shorter than that of commercial plantations probably because the trials were better managed. Compared to this crop cycle of *palmiste blanc de Maurice*, the pejibaye was clearly faster-growing. On the basis of observations in Hawaii and Brazil, it was estimated that it would reach harvest size in about 2 years in our humid and superhumid regions. Our results to date show that the average in these regions was 2.69 years, and that a crop cycle of 2 years was the exception rather than the rule. The slower growth in the trials may be due, firstly, to the fact that the soil at one site - Bois Chéri - is exceedingly poor. Secondly, at two of the sites in the superhumid zone - Bois Chéri and Sans Souci - the rainfall is probably excessive (> 3500 mm) and the minimum temperature in winter lower than in Hawaii and much lower than in Brazil. In addition, all the trials were affected by a cyclone - Dina - in 2002. We used as our norm an average heart size of 600 g which is larger than that of Brazil but not that of Hawaii. It may take longer to achieve this average heart size at one of the high densities (5000 plants/ha) used in the trials.

It may still be possible in commercial fields to harvest pejibaye after 2 years. This will require several improvements in the management of the species. Firstly, sites should be selected where the soil is reasonable deep even though it

may be unsuitable or marginal for sugar cane. Secondly, where this is possible, the land should be sub-soiled to improve drainage. Thirdly, the soil should be amended with a source of calcium wherever the pH is lower than about 5.75. Fourthly, chicken manure, the most readily available organic fertilizer should be applied at planting and every six months thereafter. Finally, the population density should be kept low or moderate, from 2500 to 3000 plants per hectare. Most of these improvements in management have been recommended (Govinden, 2004).

(ii) It produces suckers.

This unique characteristic of pejibaye had been emphasized in relation to a reduction in the cost of plantation and to the minimization of the risk of soil erosion on slopes. The pejibaye started to produce suckers at about six months. The number of suckers per plant was very variable from nil to a dozen or so. Most suckers produced 3 to 4 leaves and a stem of girth 3 to 4 cm, and then did not develop further until the mother plant was nearing harvest size or had been harvested or lost. Only occasionally, such as when neighbouring plants were absent, did one or two suckers develop further in the second year. When the mother plants were harvested in the trials the suckers then grew out very rapidly. Normally, when no sucker was eliminated, only two, or rarely, three, developed. When only the two or three most developed ones were kept, they grew to harvest size in 2 years or so depending on the original population density. It is preferable, therefore, to plant about 2500 plants per hectare and then to leave an average of 2 suckers per plant. It may also be advantageous to cut all excess suckers as from the end of year one, well before the harvest of the mother plants.

At present, the grading of the sucker heart population is not known; one suspects that it is quite variable. Suckers can be harvested in one of two ways. Either, the whole population is harvested when the average heart weight reaches 600 g, in which case, there may be a few oversized hearts and probably many undersized ones. This option is acceptable if these undersized hearts can be marketed. Alternatively, only a proportion, possibly about 50%, of the population is harvested shortly before the average heart size reaches 600g, and the rest six months later.

Most of the suckers were well-anchored, that is, they originated from well below the ground surface. But in a few trials there were many plants which were poorly anchored as shown by the presence of many adventitious roots above the ground surface. The suckers on these plants tended to be superficial. Consequently, it is recommended to plant pejibaye as deep as possible. In well-drained soils, this means placing the base of the stem about 10 cm below the soil surface. At six months, the plants can be earthed up. Also, it is important to retain only the suckers which emerge from as deep as possible rather than select the most developed ones.

(iii) Its palm heart does not oxidize.

Palm heart quality encompasses several aspects, but only oxidation was mentioned in the 1999 paper. In this update we take up all the relevant ones.

The major issue in Mauritius is not oxidation, but heart size. It is inextricably linked to the crop cycle. In the Latin American countries (Brazil, Costa Rica, Peru, Guyana, etc.) which produce pejibaye commercially for export, the palm hearts are harvested as early as possible, often annually in the case of suckers. The edible portion can then be as small as 200 g, but under good conditions, it is more often about 300 g. The upper limit in these countries seems to be 400 g. Such small palm hearts are well suited for canning. They can also be used fresh as is the case for much of the production in Brazil, but they are clearly not suitable for the fresh palm heart market in Mauritius. But the pejibaye can give larger hearts. Cases of up to 1 kg have been reported in Hawaii although the average there is about 600 g. In Hawaii, under good soil conditions and heavy and frequent fertilization, such large hearts are obtained about 15 months after planting and every year thereafter. In the trials in Mauritius, the best we have obtained is 600 g after 2 years, for example at Britannia. With better management, as explained in sections 3.1 (i) and 3.1 (ii), it should be possible in many areas here to achieve 600 g in 2 years with the first plantation and in 18 months thereafter with the regrowths.

An annual cycle may be possible with the regrowths provided that a strategy is implemented to market the smaller hearts, perhaps through supermarket chains after packaging. Only then will the absence of oxidation in pejibaye become

truly relevant. Right now, the main purchasers of fresh palm hearts are hotels and restaurants which are accustomed to species such as the *palmiste blanc de Maurice* and the coconut whose palm hearts oxidize. Having adopted methods to minimize it, they regard oxidation as a minor inconvenience. This is not so in the case of the general public which constitutes a very large potential market. This market segment can only be tapped if the crown shafts are opened and the edible portion packaged. Obviously also, the hearts should not oxidize, and the pejibaye is one of the few species, with the royal palm, which does not.

4. DRAWBACKS OF PEJIBAYE

One drawback of the species was mentioned in the 1999 paper. The reports consulted then and the observations made during the mission to Brazil and Hawaii suggested that the pejibaye was unlikely to offer good prospects in our semi-arid and even sub-humid zones. This has been borne out by the results of the trials. Fastest growth has been observed in the superhumid zone with between 2500 and 3000 mm. Growth in the zone with higher rainfall (> 3200 mm) was not as good, probably because of the poor and acid soil. When it established well, such as when good and regular rains were recorded in the first six months after planting, it grew as fast in the superhumid zone with between 2000 mm and 2500 mm. The lower limit for best growth may be 2000 mm.

In areas with less than 2000 mm, establishment may be problematic. Even when the plants established well, they suffered from drought stress in the period October to December, and growth was retarded. Strong winter winds in the period August to October caused the leaves to dry up. The first harvest was delayed to the third year. As in Hawaii, windbreaks may be necessary in exposed areas.

The trials have brought to light a second drawback which had not been anticipated. Following cyclone Dina in January 2002, the pejibaye was observed among the eight species in the trial to be the most susceptible to cyclone damage (Govinden *et al*, 2003). Tearing of leaves was found in several species besides pejibaye, and regrowth was rapid in all of them. Likewise, several species lodged slightly, but this did not seem to affect growth. This is another reason for deep planting. The pejibaye was the only species in which some stem breakage

was observed. This was attributed to its fast growth. Two strategies were proposed to minimize cyclone damage. Firstly, windbreaks should be established in exposed areas. Secondly, it was recommended to harvest the shoots in November - December before the peak of the cyclonic season since the tall plants are the ones whose trunk may break in a cyclone. The shorter plants and the suckers may suffer from leaf damage, but not from stem breakage. Since December corresponds to the period of peak demand for palm hearts, it should not be difficult to harvest all plantations which have reached the harvest stage then.

Another unanticipated drawback of the pejibaye discovered during the research project is its susceptibility to hare attack. Other species such as the royal palm, açai and *palmier de pâques* were also attacked by hares. In the case of the pejibaye only the first plantation has to be protected, preferably with a fencing. Cheaper methods may work on the scale of plantations, but they have not yet been tested successfully. Attacks on the regrowths have been of little consequence.

5. CONCLUSIONS

The local palm industry is at a turning-point in its evolutionary history. On one hand, land may be released from sugar cane. The two agricultural options which have been identified for development on these lands are fruits and palms (MEDRC, 1997). In the humid and superhumid zones, pejibaye has now been found to be the most suitable palm species. This is not so much because it grows very fast, much faster than the *palmiste blanc*. Other species such as the royal palm are as fast-growing in these zones. The reasons for preferring pejibaye are firstly, because it regrows from suckers and hence its cost of production is lower. Secondly, it does not have major pests and diseases. In contrast, the royal palm has suffered from a heart rot in the superhumid region. It is also known to be susceptible to gumming disease of sugar cane. On the other hand, there is already a large unsatisfied demand for fresh palm hearts, and this demand may increase considerably if a suitable marketing strategy is implemented to sell the product to the general public. This market segment requires a product which has been conditioned and packaged for convenience. The pejibaye is, with the royal

palm, one of the two suitable species. All the others are not suitable because the hearts oxidize.

Marginal land may also be released in the sub-humid and semi-arid zones. The most suitable species there has been found to be the coconut, not the pejibaye, which cannot withstand the dry season.

With the possible release of more land from sugar cane an opportunity may exist to really develop the palm heart industry. The pejibaye offers good prospects for several reasons including fast growth, regrowth from suckers and excellent heart quality. Although there are still management practices to be worked out, and marketing strategies to be developed and implemented, the time has come to start growing the species on a commercial scale. Members of the Groupement Palmiste followed the trials closely and were the first to see the results. In 2003 and 2004, many imported seeds of pejibaye for commercial plantation. This shows that they share the view expressed in this paper concerning the prospects of the species. The rest of the agricultural community have only recently been made aware of the results of the trials. Seeds are being imported for them at their request, and a palm production handbook has been published (Govinden, 2004) for their information. The stage is therefore set for all to develop the opportunities.

6. REFERENCES

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