



Feature article:

Advances in Dates Culture in Sudan, a comprehensive view

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ABSTRACT

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This article shed light on production, locations, indigenous cultivars and dates population in Sudan. It covered the current problems regarding culture, pest and diseases and physiological disorders. Advances in technologies, cultivars, capacity building, workshops and seminars were viewed. Highlights were made on date centers of concern in Sudan. On the horizon immediate future challenges were pointed out.

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INTRODUCTION

Dates culture in Sudan is intensified in the Northern and River Nile States in about 900 km along the banks of the Nile. Beside Southern Egypt, this area is thought to be a land of origin for dry date's cultivars. Other production areas include Darfur where the 1.5 million palms there are thought to be of seedling origin. Khartoum, Red Sea and North Kordofan States are currently involved in date's culture activity. The major dry cultivars are Barakawi which constitutes about 55% of Sudan's dates, Gondaila, Bit-tamoda, Kulma, and Gargoda beside other minor Nubian cultivars such as Nawwa, Kajnosa, Garjicola and Sherwa. The semi-dry cultivars include Mishrig Wadlaggai and Mishrig Wadkhatib,

while Madina is the sole soft cultivar. Dates population in Sudan is around 8 million palms. However, reliable statistical data for date's population and productivity are lacking. Nevertheless, the overall situation of date's culture has encountered several problems, while positive advancements had been also observed. In this article, both sides will be covered with future perspectives to counteract these limitations.

CURRENT PROBLEMS:

The information provided here-under is based mainly on the findings of a survey for assessment of date's culture, pests and diseases limitations in the Northern State, the major date producing state

(Idris *et al.*, 2006), beside recent research articles.

Culture

The general cultural constraints include inadequate and irregular irrigation and fertilization. Research outputs demonstrated double to triple yield gains upon fertilization with urea and super phosphate (Idris *et al.*, 2012a). The implementation of farm yard manure plus a low dose of NPK also proved to be a yield enhancive approach (Idris, 2013). Yield was also increased by regular irrigation every 10 days (Idris, 2013). Hence adoption of these technical packages would improve the returns of growers and increase Sudan's tonnage.

Ignoring regular palm pruning is among the critically negative practices in the last ten years. In the past, dry leaves and remains were used for household cooking-fire purposes, but the adoption of butane-gas as a substitute resulted in ignoring of pruning. The impact of this situation is clearly observed in scattered leaves remains on the soil beneath and between palms. Large scale fires had been reported leading to the extinction of thousands of palms in any single incidence. The control efforts are aggravated when such fires occur in Nilotic-islands where steamers capable of transporting fire-combating vehicles are lacking. The presence of termites as natural degradation elements of such products is expanding to a degree endangering the palms, other fruit trees and crops.

Pests and diseases

Numerous pests had been reported in Sudan's date culture. Among the most serious, termites rank top, followed by the white scale insects, mites and the green-pit-scale insects. Devastating effects on yield and quality of the

produce had been reported for the green-pit-scale insect, but research efforts alleviated the situation (Abdalla, 2012). Diseases do not constitute a real threat, although widespread of numerous fungal diseases had been reported. *Diplodia*, *Thevaliopsis*, and *Fusarium* are among the most widespread fungi. However, there are fears of the probability of infections with Bayoud disease as Bayoud-like symptoms were observed, but the feasibility of local serological and molecular confirmatory tests are lacking. Nevertheless, unidentified disease symptoms were also observed. Further efforts are needed to deal with date's diseases especially after the establishment of Merowi Dam which will increase the atmospheric relative humidity that favours the incidence of fungal diseases in general.

Physiological disorders

Irregularity in flowering is a current problem as flowering occurs more than once; hence the difficulty of frequent pollination is faced. Besides, in recent years temperature extremes might be the reason behind fruit shriveling; a phenomenon contributing to considerable yield losses. The question of the impact of climate change remains valid.

ADVANCES:

Technologies

A tissue culture facility had been established in Shambat by a joint venture between the Government of the Northern State and the Agricultural Research Corporation in an effort to enhance the propagation potency of desirable cultivars. Besides, Karima Date Processing Factory was rehabilitated a few years ago. Its mandate had been restored. Besides, other small scale date's processing units had been

established. In line, some improvements in packaging were achieved such as adoption of cartons instead of bulky jute sacks; a situation that would help marketing.

Cultivars

To enrich the national gene pool of Sudan, the private sector imported and planted tissue cultured propagules from Saudi Arabia and Emirates. The introductions were for around 20 soft and semi-dry cultivars such as Barhi, Nabbout, Sukkari, Majhool, Saq'ie, Barni and Khalas. Parallel effort was undertaken aiming towards selection of qualitative seedling clones from the existing one million populations of seedling clones. This effort covered Merowi area under the umbrella of the Agriculture Research Corporation (Ibnouf, 2012), while similar effort of selection was accomplished by Sudan University of Science and Technology in the area extending from Alborgaig and Abri towns on the eastern bank of the Nile where Elmahas and Elsakkot tribes reside (Idris *et al.*, 2014). Both teams obtained selections superior or equal in quality to the dominant commercial cultivars. However, the only means of mass multiplication of these clones is by tissue culture. Comparative evaluation of the traditional cultivars was also accomplished (Idris *et al.*, 2012b).

Capacity building

Academic qualification of young scientists specialized on date palm is a continuous effort. The current number of date specialist in Sudan is 8 Ph.D. and 8 M.Sc. holders in different disciplines such as molecular biology, tissue culture, insect pests, pathology, cultivars, pollination, male selection, nutrition, irrigation and processing. Still, others are in the queue.

Coupled with academics, a popular society concerned with culture was established. It has an annual non-scientific extension magazine. The society organizes an annual event at harvest time in Khartoum, where updates on problems and progress in culture are discussed; with an accompanying exhibition of dates and their products. The society also sponsors extension missions accompanying dates specialists to accomplish on-farm training.

Workshops and seminars

A regional workshop on date palm problems in Sudan was sponsored by Sudan University of Science and Technology in 2003. The same institution sponsored a national seminar on date palm research output in Sudan during 2004- 2012 where more than 20 research articles on the topic had been presented.

CENTERS of CONCERN:

Beside the Federal Horticulture Administration, the Ministries of Agriculture in the Northern, Nile and Khartoum States compose the main concerned executive bodies. The Agricultural Research Corporation is the responsible body for applied research to solve grower's problems. Besides, Sudan University of Science and Technology leads basic scientific research and the role of qualifying young scientists in different disciplines dealing with date palms. Other institutions of minor contribution include the universities of Dongola and Wadi-elNeel.

ON THE HORIZON (Future challenges):

Some of the 750000-1000000 soft and semi-dry tissue culture introductions started bearing. Difficulties concerning receptivity of pollen grains had been reported. Off-types were also reported.

Cultivar suitability studies are needed to decide their adaptation to the conditions of different growing states. Beside these challenges, advances in the post-harvest handling of these cultivars are badly needed as the conventional dry cultivars are storable under the ambient conditions without remarkable losses.

The probability of Bayoud disease incidence needs serious observation as mass deaths have been reported recently without concrete interpretation or identification to the causal agent.

Finally, the difficulties attributed to climate change especially temperature fluctuations that cause irregular flowering and fruit shriveling in the ripening stage of dry dates, necessitates regional or international research efforts to alleviate the situation.

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