

Article

Varietal diversity and calendar of maturation of dates at low Sahara; what economic perspective?

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Abstract : The region of low Sahara constitutes the oldest agricultural regions of Algeria, specialized in the culture of the Date palm or "Phoeniciculture". The first objective of this study consists in updating the inventory of this diversity. The second will allow to list cultivars with regard to their periods of maturation and by pond. Consequently, it would be easy to establish a calendar of maturation of the Algerian dates by pond. Results showed that varieties differ by their forms, tastes and especially by their period of maturation. We find the varieties Deglet Nour, Ghars, Mech Degla, Tantboucht, and Degla Beida in almost all of regions. The varieties of lower quality are intended for the animal feed. These common varieties represent between 40 and 50 % of the potential phoenicicole of Low Sahara (5). All these varieties present the advantage of a maturation spread, over 6 months of the year from July till December. This investigation revealed a wealth about cultivars 400 among which of the little known sorts Specific to certain localities deserve to be valued for diverse even strategic socio-economic, cultural, ecological interests.

Keywords : date palm; varietal diversity; calendar of maturation; prospect; socioeconomic and cultural; strategic interests

1. Introduction

The date palm constitutes a strategic and symbolic culture in Algerian Sahara, which represents 90% of the national territory, that is a wide fraction of the big Saharan desert covering more than two million of km² [1]. The culture of the Date palm has a major role in the ecological and socioeconomic stability of these environments. It is a vital catalyst of the Saharan urban areas often enclosed and subjected to a climate of the most severe.

At the origin of the creation of the first human establishments called today "oasis", in the hostile conditions, the date palm creates and maintains another microclimate favorable to the development of the more delicate trees and herbaceous species [1].

Several phoenicoles ponds are identified (Aurès/Nememcha, Ziban, Souf, Oued Righ, Ouargla, M'zab, Touat/Gourara, Tidikelt/Tassili, the valley of Saoura). Economic poles are born there and developed the most famous of which are: Ziban, Souf, Oued Righ and Ouargla constituting Low Sahara, which shelters to him only 67% of the potential of the national production of date [2].

This privileged and representative area of the Algerian palm grove for the culture of Deglet-Nour in Algeria at the level of 50 in 60 %, also shelters a big diversity of cultivars in particular in the old exploitations, in the middle of the antique oases [3] and [4]. These cultivars represent together from 40 to 50 % of the potential phoenicicole of Low Sahara [5].

All these cultivars differ from one another by their intrinsic characteristics: their forms, their tastes, and in particular their periods of maturation. These variations are observed from a one region to another, for the same variety, under the environmental effects.

The establishment of a calendar of maturation - from the dates of maturation of every variety- requires an inventory of this varietal diversity, by identifying the most important local cultivars (the most appreciated by the local populations). These works constitute a first contribution of the research in this domain.

2. Materials and Methods

2.1. Study area

The investigations were led to phoenicicoles ponds of the Ziban, Souf, Oued Righ and Ouargla, (in low Sahara). They represent four important ecological entities on a total of ten ponds phoenicicoles distributed on nine saharan wilayate in the Algerian territory. The importance which has the Low Sahara justifies itself by the representativeness of phoenicicoles surfaces, the big quantities of dates and by the presence of the variety Deglet Nour of high commercial value.

2.1.1. Administrative situation

Administratively, the region of study (Fig.1) covers completely three wilayate of the South / Algerian East which are: Biskra, El Oued and Ouargla. It is situated on the Tunisian border.

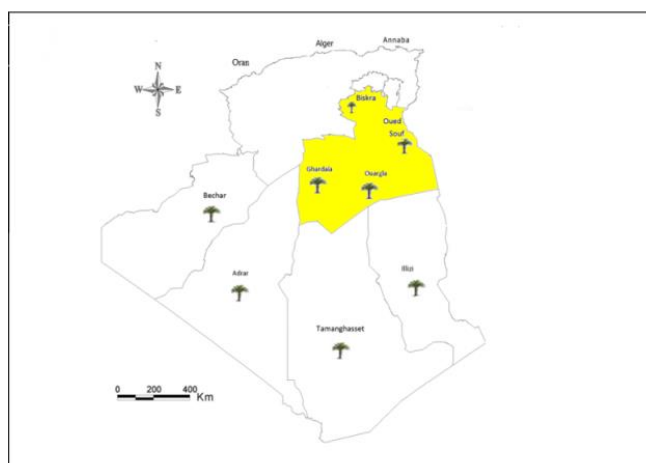


Figure 1. region of study

2.1.2. Geographical situation

The three administrative entities or wilayate are akin but very different geographically. Biskra, which is the most situated in the North, is distant from Algiers of some 400 km; it just begins in means and low Aurès piedmonts. It extends from east to west on very fertile plains, until Oued Djeddi. The wilaya of El Oued announces by its saharian pastures strewed with some oases very known through the date palm, the camelin and caprin breeding. Ouargla, also, is a space typically Saharan, livened up by the oases of palm tree and camelin breeding.

2.1.3. The physical environment (climate, resources in waters, grounds)

Covering more than two million of km² [1], the Sahara consists of a central band of absolute desert, corresponding to central Sahara, which is framed by two bands of desert limited, indicated by Southern Sahara and by northern Sahara or low Sahara. It is subjected to an extreme shape of the Mediterranean climate [6,7]. In the same time, it shelters the most important oases Algerian phoenicicoles and in a denser way than in Southern Sahara.

Weather conditions are more favorable for the blooming of the culture of the palm date. These oases cover 63 000 Ha including up 6 626 000 palm date, 60% among them are

located in the northeast of Sahara (Ziban, Oued Righ, El Oued and Ouargla) and 40 % in the West (M'zab, Touat, Gourara, and Tidikelt).

To carry out this study we carried out outings on the different oases of the different ecological entities. In order to sample the different cultivars at different stages of maturation, we used the traditional kit (locally called *Ida*) to climb the palm trees and a GPS to record the sampling point. The dates harvested are put in craft paper bags, all placed in plastic boxes. In the laboratory, we take photos of the different stages of maturation of the dates as well as the measurements of the dates on millimeter paper.



Figure 2. investigation of questionnaires

2.3.1. Investigate

Inquiries are led, in several stages, according to a schedule and a program by pond phoenicole. During each investigation, a questionnaire by exploitation is jointly informed by the researcher and in the same times the developer (or the owner).

Besides the relative general information on the exploitation, the notes over the periods or dates of maturation, the importance of cultivars in the region, their degree of appreciation locally, the possibilities of the marketing in or out the region are raised.

The investigation has for objectives:

- List the existing cultivars;
- Mention for each, the period of maturation;
- Inform us about the interest the cultivar concerning the marketing;
- Note the frequency of the listed cultivars.

Besides, we take samples of every cultivar listed for needs for varietal collection

3. Results

We expressed the results at three levels: diversity, frequency and maturation periods.

3.1. The varietal diversity listed

The varietal identification constitutes a stage very important for the dates of maturation. It was, in this project, based on the morphology, the color and possibly tastes for very nearby cultivars.

According to Marchenay P. [8], there is no standard method to investigate. Too many variables and imponderable elements interfere. The recognition of cultivars is very difficult: for the same cultivar, it is possible to note morphological differences from a palm

grove to another one. Only phoeniculteurs is still capable of distinguishing the cultivars of their own garden [9].

Only through the morphological characteristics (shape, color and size), we could, in priori, found a notable diversity which reflected a wealth of the holding phoenicole varying from a country to another, even from an exploitation to another of a same pond when the factor maintenance is dominating, in particular the irrigation.



Figure 3. some varieties of dates

Rhouma [10] thinks that these characteristics can vary for the same cultivar according to the conditions of culture, the maintenance and the age of the cultivar (tree). The general aspect of the plant and especially that fruits remain the only valid criteria for the recognition and the distinction into cultivars.

The not exhaustive inquiries, realized, allowed us to observe a big diversity esteemed at more 400 varieties of date which is little known (Fig.3). Often, these varieties were of premature maturing and were collected by gleaning and locally consumed as fresh fruits by the farmers and their families. At present, these dates make shy entrances in the local markets.

3.2. The frequency of the listed cultivars

Some cultivars were frequent; among which we quote:

Arechetti - Baydh Elghoul - Baydh H'mam - Bouhlas - Chebihet Elghars - Chetwiya - Deguel Elyabes - Garn Ghezal - Hamray - Of iron ElGuett - Ouayat ElGhars - ouayat Elhora - ouayat Halwat - Sabaâ Boudhraâ - Safraya-Sokraya - Litima - Degla Beidha - Deglet Nour - Ghars-Kesseba --Elghazi - sbâa ârous - Elkhadheray-Elhora - Tantboucht-Tinicine.

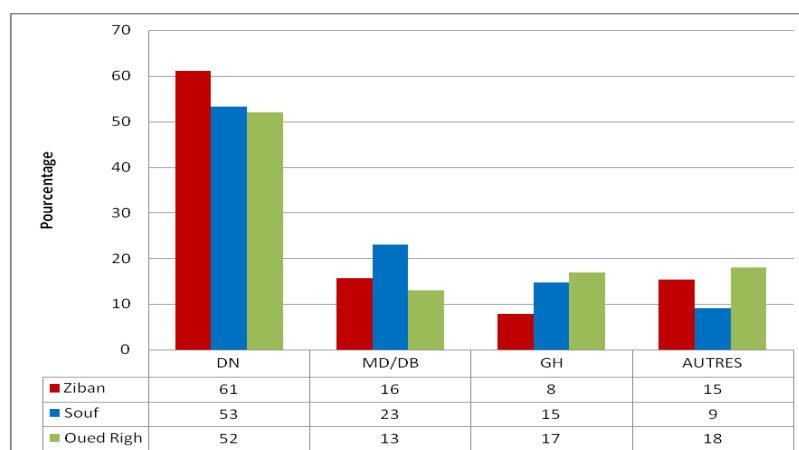
Another category of identified cultivars and characteristics of certain localities (and were very appreciated by the local population) like: Ftimi: to Khanguet-Sidi-Nadji (Ziban-Est); Zogar mogar: to Tolga and to Bordj Ben Azzouz (Ziban-Ouest). These cultivars existed with 1 in 3 trees by exploitation for the family consumption. Some cultivars among those cities are eminently endangered by default of djebars (current way of vegetative multiplication) as:

- Zogar mogar in Ziban pond;

- Messouhi-Chelgoumia in Souf pond;
- Deglet-E'Nabi / Ozel in country of Ouargla;
- Tarmont - Tati: Sidi Mahdi in Oued Righ pond; there are some cultivars (about fifty palm date in all low Sahara).

A comparative representation of the main groups of cultivars (Deglet Nour; Mech Degla/Degla Beidha & Ghars), by pond phoenicicole (Fig. 4) showed that Deglet Nour monopolizes of more than 50 % of the number of palm date on the Low Sahara with ascendancy in Ziban.

Knowing that the regional potential is considered at 12 000 000 of the Palm trees of palm date planted on a surface of 100 000 ha of irrigated lands.



(DN: Deglet Nour; MD: Mech Degla ; DB: Degla Beidha ; GH: Ghars)

Figure 4. Importance of the varietal diversity in phoenicicoles ponds

3.3. The calendar of maturation

The holding phoenicicole is characterized by an important biodiversity [11,12] and a large number of cultivars [4] which mature in various periods; since the beginning or in the middle of July, till the end of December: a spreading of the maturation over six months a year.

Some varieties «called summer dates «is collected in stages of partial maturity and are freshly consumed. The harvest is, often, made by gleaning according to the maturation of dates during July, August and September.

The varieties of dry dates (Mech Degla, Kentichi, Degla Beidha, Bouhles, El Helwa), have to carry out their total maturation to be collected. They are rather considered as dates with maturation of season.

The variety Deglet Nour, the date half soft, is harvest only in a moved forward enough maturation and / or total for a preservation of the organoleptic characteristics.

Other varieties such as Larichti or Arichti, according to regions, consumes at the stage Belha or Bser (dice the bait of the process of maturity of the date, when its color turns of the green to the yellow).

The varieties of dates which consume at a stage partially (of 1/3 to 3/4) Martouba or (Routab) are locally called to M'nagueur. It is collected by gleaning allowing an exploitation gradual and spread out by fresh dates.

A statistical approach by agro-ecological unity is elaborated on the basis of inquiries realized in the region of Low Sahara.

3.3.1. Pond phoenicicole of Ouargla

We noticed an overlapping of the period of maturation with a peak the second decade in August (Fig. 5). Most of cultivars of dates enter maturity during the second decade of August.

At the end of the second decade of September, all the diversity of palm trees date palms enter maturation. The varieties with late maturation such as Deglet Nour is little frequent in this Pond. It is the pond where the maturation of dates is concentrated between July and September or during 70 in 80 days in all with a peak in the middle of August.

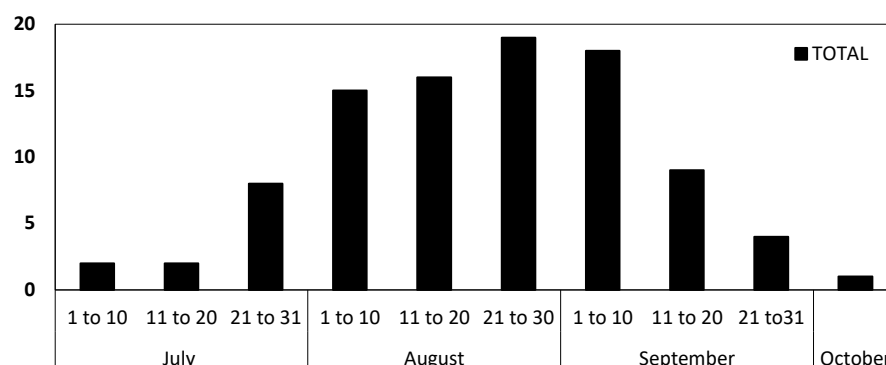


Figure 5. Comparison between the period of maturation of date 's varieties

3.3.2. Pond phoenicicole of Oued Righ

The maturation follows a parabolic curve with an entrance to maturation of almost all of cultivars enter the third decade of July until the second decade of September. More than 50 % of the number of varieties of listed dates ripens between July 20th and September 10th is in 50 days in most. The late cultivars pursue their maturation after (Fig. 6).

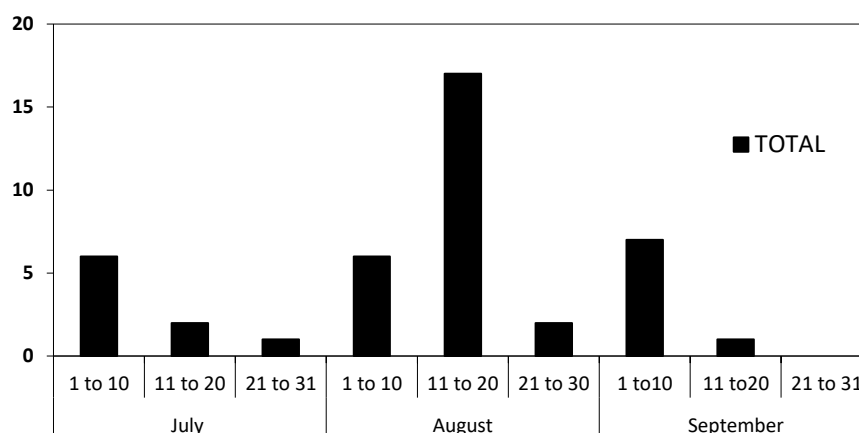


Figure 6. Comparison between the period of maturation of date's varieties

3.3.3. Pond phoenicicole of Souf

We noticed that the period of maturation spreads out from July till September before a peak situated between the first decades of August and going to the first decade of September when almost all of cultivars enter maturation (Fig.7). The number of premature cultivars is reduced with regard to Oued Righ. Furthermore, in this pond, the same to

cultivar can register more than a date of maturation of its fruits in touch with the regions of existence.

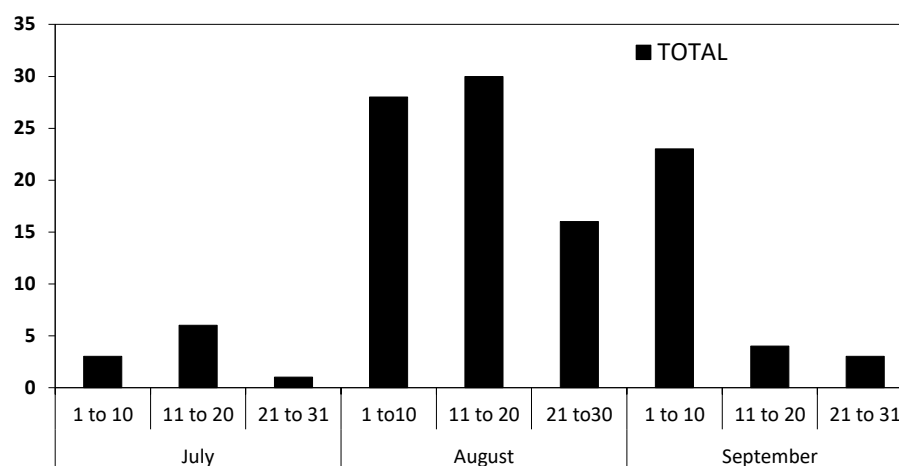


Figure 7. Comparison between the period of maturation of dates varieties

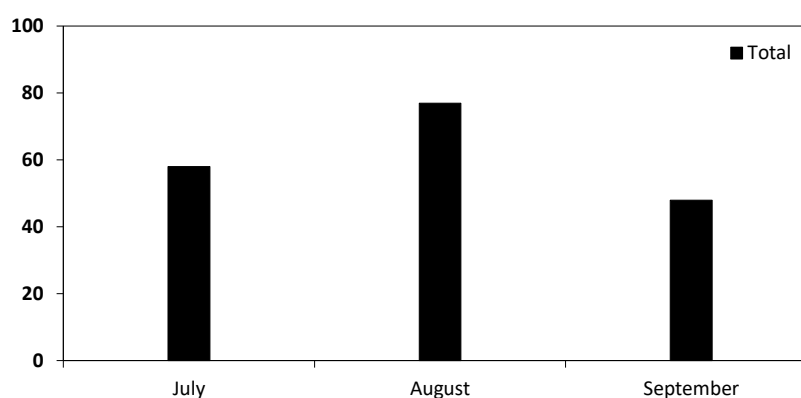


Figure 8. Comparison between the months of maturation of date's varieties

3.3.4. Pond phoenicole of Ziban

There is an almost homogeneous distribution of the maturation with a light peak in August (Fig. 8). An important number of premature cultivars enter maturity dices the July, while almost totality of the variety dattière ripens in August. Furthermore, these dates of maturation vary from a soil to the other one in the same pond, because of the differences ecological conditions which reign there.

With regard to the rate monthly rate of maturation, we noticed the same tendencies as for the periods of maturation respectively for the ponds of Ouargla, Oued Righ, Souf and Ziban (Fig. 9). However the peak of maturation is more moderated in Ziban followed by Oued Righ, with regard to the other Ponds. This is understandable by the importance of the diversity phoenicicole and especially in premature varieties.

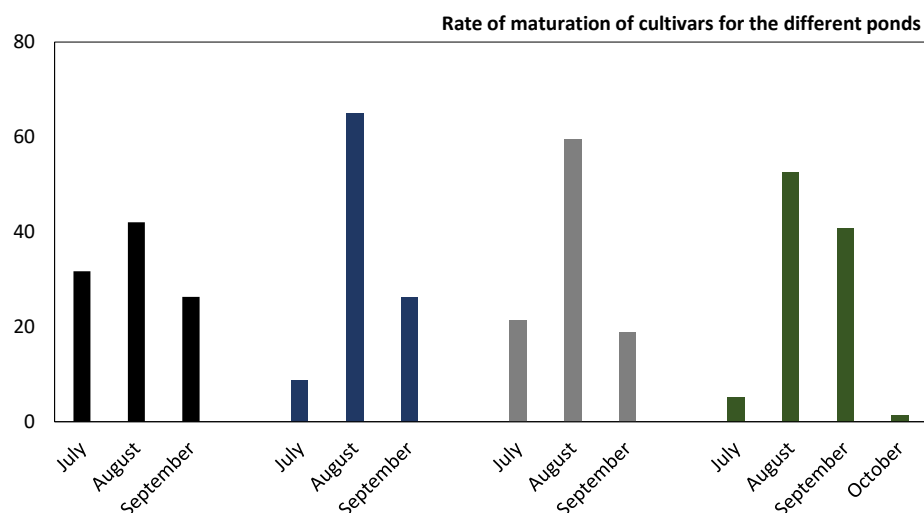


Figure 9. Monthly rate of maturation of cultivars for the different ponds (Pond of Ouargla, Pond of Oued Righ, Pond of Souf and Pond of Ziban)

We noticed that the maturation is activated (more important) in August when the rate of cultivars entering maturation is the highest. In October, we registered low rate in worthless according to the phoenicicole pond (Fig.9). It was understandable by the fact that toward the end in September, the late cultivars begins their maturation which continues at the end of autumn. This phenomenon of maturation can last three to six weeks according to cultivar and country for the same cultivar.

By way of example for illustration, the maturation of the variety Ghars is finally observed in June / beginning July to Ouargla; one week in ten days later to Oued Righ and, then to El Oued, to reach (affect) Ziban towards the 2nd ten days (decade) of August. This makes available the dates of this variety during a long period.

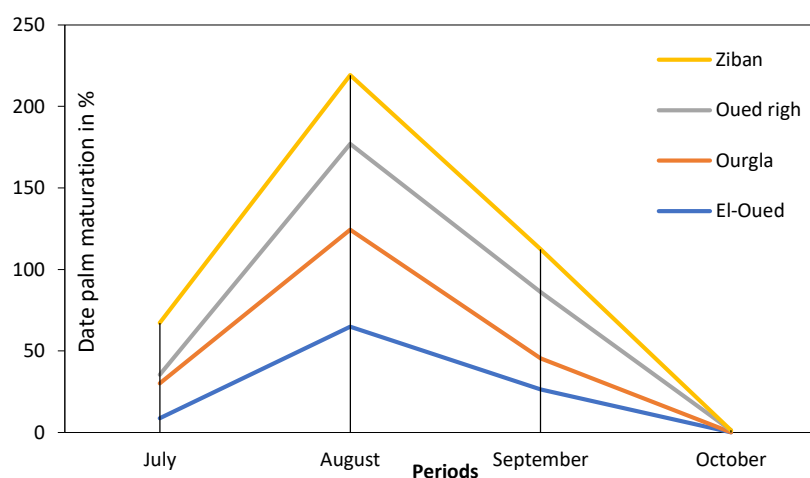


Figure 10. Date palm maturation in different ponds

The analysis of the variance revealed a significant difference at the threshold of 5 % of the rate of cultivars entering maturation between phoenicicoles ponds. Ziban count more of cultivars than the other ponds, even if the tendency is almost identical in board and Figure 10.

Table1. Board of the Analysis of the variance

Origin of the fluctuation	The Sum, Nap in the square	Degrees of freedom	Variance	Calculated F	Théor. F 5%	F. Théor. F 1%	Théor. F. 10%
Total	3940,55	11					
Blocks	0	3	0	0	4,76	9,78	3,29
Treatments	2957,85	2	1478,93	9,03	5,14	10,92	3,46
Residual error	982,71	6	163,78				

Rule:

If $F_{\text{calculated}} > F_{\text{theoretical}}$: we reject H_0 that is: there are significant differences between treatments.

If $F_{\text{calculated}} < F_{\text{theoretical}}$: we accept H_0 that is: there aren't significant differences between treatments.

On conclusion at the threshold of 5 % meaning we notice that there is a significant difference for the percentage of maturation with regard to Ponds.

5. Conclusions

The palm tree date palm, symbolic tree of Sahara and which plays a social, economic, cultural and ecological role, allowed for regions the preservation of the durability of the oasiens ecosystems implanted in hostile circles. It attracts, today, and more than ever, a particular attention. It deserves to be known and/or recognized and valued more (in its just value) on several aspects, among others, its diversity and the asset which presents the spreading of the maturation of its dates.

The territorial diagnosis led in Low Sahara, confirmed us once again, that the food habits, the mode of preservation, are in total harmony with the various periods of maturation of maturation of dates and are in favor of this biodiversity within countries. What allowed, in these small rural parts of the country, very often taken away from big city centers, an automobile smugness in fresh dates in diverse farm produces practiced under palm trees.

The palm grove constitutes for the farmers, the establishment where he spends all his time in there: maintain the long-lasting cultures and to practice those annual to satisfy, its daily truck-farming and fodder needs for his family and for its domestic livestock.

He allowed us to list of cultivars 400 which their period of maturation of dates out from July till October with a peak registered in August. It establishes an indicator of the intensity of the economic activity (hand of work, job offer seasonal worker, transformation, storage.).

The main perspectives are:

- In the development of the even international national marketing of these fresh (cool) dates to the tastes, the forms and the color highly varied by the innovation of processes and techniques of preservation, transport that must allow to protect the organoleptic and nutritional aspect of the fruit;

- In the valuation of dates not or little merchantable by the crenels of food-processing transformation (processing) intended for the human, animal consumption and for the diverse uses industrial, cosmetic, medical.

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