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Physical Characterization of the Main Local Legume Seeds in Oasis of Chenini

Zeineb KHILA*[1], Mansour HADDAD[1], Ali FERCHICHI[1]

Abstract: The seed produced locally are much valued in circles with biotic and abiotic stress and which house promoting exchange such as the oasis. More these seeds are kept; the greater the chances are reassuring to meet the nourishment of future generations.

In this framework, this study aims identification and characterization of the major seed of the local vegetable species in a coastal oasis, that of Chenini. The physical characterization of these seeds shows that:

- Specific purity is low for the blette be 59.12%, average for the parsley, radishes and carrots and very high for onion, turnips and cucumber, they are respectively 93.29%m, 94.13% and 94.10.
- The high doses of NaCl in irrigation waters have created a regression of germination rates of species studied except for the turnip who keeps a germination rate high enough 82% even with the solution 6 g/l NaCl.

Keywords: Germination, Oasis, Seed, Specific purity, Vegetable farming

1. Introduction

Local seeds are produced by the activities self-production based on indigenous knowledges and mechanisms of dissemination premises. They were subject selection on several centuries so they are relevant to the weather and soil of their region. These seeds are fundamental for the conservation of genetic variability necessary for the creation of new varieties strong with senior levels of adaptation to drought and salinity (Dollacker and Rhodes, 2007). In this context, the oasis is one of the most fragile agro ecosystems, characterized by abiotic stresses: saline, fluid and climate. Their sustainability is dependent on the local vegetation allowing soil conservation and productivity Taeb (1999). Its seeds are confronted with the use of introduced seed. This has created problems of genetic erosion and disruption of biodiversity Hamilton (2001).

These speeding the risk of decline of varieties cultivated food (Fenster *et al*., 1994; Hufford *et al*., 2003). In addition, among the most important oasian cultures are legume that indicates a great wealth and variability. Indeed, the genetic heritage of Tunisian includes very many species and vegetable varieties. It is known worldwide by its wealth and its properties of resistance to disease, to certain pests and drought Hamza (1991). In this regard the conservation and preservation of vegetable seeds local become a necessity. This study was intended to establish a physical characterization of seed local of the main vegetable farming in oasis of Chenini. This characterization will participate to the sustainable development of oasis by preservation of these seeds.

2. Materiel and methods

The samples of seeds were collected at random from farmers in oasis of Chenini. The species studied (Turnip, cucumber, onion, radishes and blette) were selected because they are the main legume whose seeds are still produced locally in this oasis.

2.1. Specific Purity

Weight of initial batch of each species as well as the impurities contained have been determined, and deduct the specific purity by the following formula:

(Weight of initial batch) - (Weight impurities) / (Weight initial batch of X 100)

2.2. Study of the germination in normal conditions and under stress saline

The study of the germination has been driving under the conditions of the laboratory. For that 25 seeds have been distributed randomly into Petri boxes full of cotton on water. These seeds have been

[1] Institute of Arid Regions, Arid and oasis cultivation Laboratory Km 22, 4119 ElFjé Mednine Tunisia
*Corresponding Author: E-mail: fatemaazzahra01@yahoo.fr, Fax number: 75 228 088

subject to a treatment at NaCl with doses ranging from 0 to 6 g/l. Four solutions containing respectively 0 (distilled water), 2 (water of oasis), 4 and 6g/l (T1, T2, T3 and T4) were prepared. For each treatment, four repetitions have been implemented. The tests during which we counted daily seeds sprouts in each box lasted 4 days for the Turnip, cucumber and the radish, 5 days for onion, 7 days for the blette.

The comments have focused on:

- The Sprouting or the germination rate of seeds (GR): the percentage of seeds can germinate in conditions well defined.
- The sprouting speed: is the time set by the seeds to germinate. It is expressed by the time to reach 50 % of the sprouting capacity; it is to say to the sprouting of 50% of seeds.

3. Results and discussions

3.1. Specific Purity

The average of specific purity relative to studied species is presented in **Table 1**. This table shows that the turnip is species which presents the specific purity higher, followed by cucumber, onion, radish, carrot and parsley respectively: 94. 13%, 94.10%, 93.29%, 87.5%, 84.4 and 79.63%; while the blette is species which has the lowest specific purity.

3.2. Germination or sprouting rate of seeds

The purpose of this experiment is to clarify the resistance of each species to salinity. The germination rates are illustrated by **Figure 1**.

The analysis of this figure shows that the turnip is more resistant species to the strong dose of NaCl. Indeed even with the solution 6 g/l this species has kept a germination rate high enough 82%. The seeds of the blette offer low resistance to the high salinity. We have registered a germination rate of 11 and 8%, respectively with the solutions 4 and 6 g/l.

Table 1. Average Purity specific of studied species (%).

Espèces	Pureté spécifique moyenne
Cucumber	94.10 %
parsley	79.63 %
Radish	87.5 %
Carrot	84.4 %
Blette	59.12 %
Turnip	94.13 %
onion	93.29 %

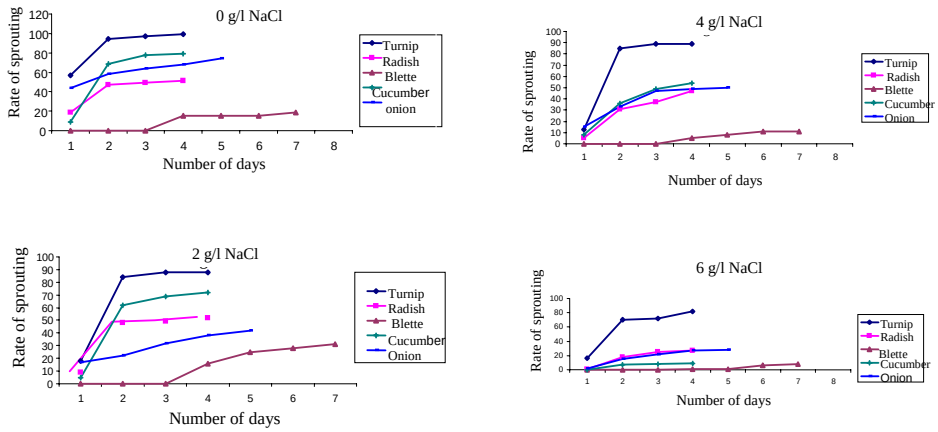

Fig. 1. The rate of germination variation of different species studied dealt with the concentrations 0- 2- 4 and 6 g/l of NaCl.

Seeds of cucumber not stand up to high dose of NaCl (4 g/l) a rate of sprouting of 9 %. The germination rates of radish decreases with increasing doses of NaCl in irrigation water. For onion, the germination rate does not diminish with the solution 6 g/l of NaCl. We mention that the testing of sprouting on the carrot and parsley revealed no result even after 27 days. It seems that seeds collected are outdated.

3.3. Effect of salinity on the speed of sprouting

Table 2 represents the speed of sprouting of each species for the various level of salinity.

This table shows that the blette is species which presents the lowest speed of sprouting. Indeed, with the 4 treatments his germination rates did not reach 50% even after 7 days (168 hours). However, the turnip presents the greatest speed of sprouting. Treaty to distilled water, its germination rates reached 50% before the first 24 hours. In addition, he keeps the best speed of sprouting even in the presence of 4 and 6 g/l of NaCl either 34 hours.

As for the radish, to germinate 50 % of its seeds have put more than 80 hours as well for distilled water that water of oasis. The germination of this species is very delayed under the effect of NaCl. Indeed, treated with the solutions 4 and 6 g/l of NaCl it has not reached the 50 %. In addition, the speed of sprouting of cucumber is moderately affected by the variation doses of NaCl. It is 24 hours in the presence of distilled water and it goes to 84 hours for the solution 4 g/l NaCl. So it exceeds the 96 hours for the solution 6 g/l NaCl. Finally, onion has put more time for that its germination reaches 50 % is 120 h for the solution 4/l NaCl, for the other two treatments its germination has not reached 50 % even after 120 hours.

The response of the seed germination stage according to different doses of NaCl has been studied by several authors. For example, working on the seeds of *Prosopis flexuosa*, Catalán *et al*. (1994) showed a dramatic decrease of germination rates with the solution 0.2 M NaCl, this decline is still pushed with the solution of 0.4 M Na Cl.

Table 2. Variation of the speed of sprouting (hours) species considered in terms of the salinity.

Espèce	0g/l NaCl	Oasis water	4 g/l NaCl	6 g/l NaCl
turnip	before 24	34	34	49
Radish	90	84	*	*
Blette	*	*	*	*
Cucumber	42	42	84	*
onion	34	*	120	*

4. Conclusion

Currently, the use of local vegetable seeds is more and more reduced. Farmers taken by the good performance of introduced seed registered during the early years have abandoned their own seed unintentionally. But, these imported seed proved inadequate to new conditions, they were demanding large quantities in fertilizer, pesticides and water. In the longer term, they were causing soil degradation, the emergence of new diseases and the lower level of production (Chavez *et al*., 2007). The characterization that has made showed that the local seed studied are particularly well suited to stress saline. Indeed, this characterization has enabled us to conclude that:

- The seeds of turnip are characterized by a specific purity of 94.13%, their germination rates is maintained high even with the high doses of NaCl. According to Francois (1984) turnips are more tolerant to the salinity to the stage of sprouting than stages reflected rotate. In effect, a level of salinity of 11.6 dS/m reduced the growth of roots to 95% while it has no effect on the final rate of germination of seeds.
- The seeds of radishes have a specific purity of 87.5%, their germination rates decreases with increasing doses of NaCl he reached 27% with the solution 6 g/l of NaCl. This effect persists during the other stages of the growth of the plant. For example (Waisel and Breckle,1987) noted that the salinity inhibits to varying levels of growth different types of roots of radishes.
- The rate of germination of cucumber seeds fall with the very high doses of NaCl (6 g/l), he reached 9%.
- In the early stages of sprouting, onion is resistant to the dose 4 g/l of NaCl and not to the dose 6 g/l NaCl. A study by (Shannon and Grieve; 1994) showed that during the steps following, salinity reduces the

diameter of bulb, his weight, the growth of roots and the number of leaves by plan.

- Purity specific registered for the seed of the blette is 59.12%. These seed offer low resistance to the high salinity. We have registered a germination rate of 11 % and 8% respectively with the solutions 4 and 6 g/l.

This scientific knowledge of physical and morphological characteristics of local seeds must be followed by a more detailed morphological characterization and a study of physico - chemical properties of edible vegetables. This will maintain this local heritage well identified in gene banks and to produce varieties more efficient require less care (Martinez, 1999; Flyman *et al*., 2006).

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