



Note from the editor

I am pleased to present you the first issue of the Date Palm Newsletter. I received a number of e-mails from people asking to receive the newsletter but only four scientists actually sent information about their projects. This means that a number of persons would like to have information on date palm but are not interested in sharing what they are doing. The main purpose of this newsletter is about sharing information. This infers that we give some to receive more. This newsletter is just a personal initiative to which I devote my free time. It is not sponsored by any organization and it's entirely independent. I had this idea because I realized that the Date Palm Forum on the internet was not efficiently used to communicate. Let us hope that this mean of communication will be more successful.

Now, this initiative can either grow or die at birth. It's up to all of us members of the date palm community to make it work. How? To start with, send any information you would like others to know about your work on date palm. Then, just spread the news about this newsletter so that other people can be part of it.

I was planning to publish articles in French in a French version of the newsletter, but since there is only one article, I decided to have it in here.

This first issue was sent to 102 scientists and professionals and hopefully you will be more to receive it and to contribute to it.

Finally, I would like to thank Pr. A. Bamouh for his precious help.

Mechanisms of date palm defense to bayoud disease.

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Key words :

date palm, bayoud, resistance, defense mechanisms, elicitor, suppressor.

The Bayoud disease, caused by *Foa*, constitutes one of the limiting factors of the date palm culture. Efficient prevention is to be found in the development of resistant cultivars. The present research is related to the genetic of genetic improvement programme aims at a better understanding the mechanisms of defense involved in the date palm resistance to *Foa*.

Abstract : Several defense mechanisms are induced in the date palm in response to *Fusarium oxysporum* f. sp. *albedinis* (*Foa*) infection, such as the induction of phytoalexins biosynthesis, the intensification of lignification, the accumulation of cell wall-bound phenolics and the increase of accumulation caffeoylshikimic acid (CSA). The induction of these mechanisms is always early and intense in the resistant cultivars, whereas it is late and weak in the susceptible cultivars. These mechanisms depend on the activity level of phenylalanine ammonia-lyase (PAL). The stimulation of the PAL activity is related to the carbohydrate mycelial wall elicitor. The differential induction of the defense mechanisms in resistant and susceptible cultivars does not seem to be related to the degree of induction of de the PAL, but to the intensity of the suppression of its expression by the pathogen.

Results and discussion

The CSA, a major soluble phenolic compound of date palm roots (1), represents one of the host resistance factors to (*Foa*) (2, 3). The CSA doses accumulated in the resistant cultivars inhibit directly and indirectly *Foa* growth and development and the activity and the production of the pathogen cell wall-degrading enzymes (CWDE) (polygalacturonases, pectinemethyl-esterases, polygalacturonate trans-eliminases, cellulases and proteases). Thus, the CSA generates hydrolysis (particularly caffeic acid) and oxidation (quinones) products which inhibit

the growth and development and the extracellular CWDE of *Foa* (3). The caffeic acid and quinones are associated to the postinhibitins and the CSA is associated to a phytoanticipin. The inoculation of the date palm roots by *Foa* induces biosynthesis of phytoalexins (propyl-7-aesculetin and hydroxy-5-propyl-7-aesculetin). The time course accumulation of these molecules clearly distinguishes the resistant and susceptible cultivars (4). The phytoalexins implication in the date palm resistance is related to the speed and the intensity of their accumulation at fungitoxic concentrations in the first pathogenesis stages. Moreover, the cell walls of the resistant cultivars are more resistant to the action of *Foa* CWDE than those of the susceptible cultivars. Two constitutive mechanisms of the cell wall resistance are highlighted in the resistant cultivars (5). In the early stage of the cell wall hydrolysis, mechanical mechanism, using lignin and cell wall-bound phenolics (*p*-hydroxybenzoic acid, *p*-coumaric acid, ferulic acid and sinapic acid), limit the action of the CWDE on the host cell wall. A second chemical mechanism intervenes at more advanced stages to inhibit the production of the pathogen CWDE. This inhibition is related, at least partly, to the involvement of the phenols esterified in the cell wall (6). In addition, the post-infectious response of lignin and cell wall-bound phenolics contents in the resistant cultivars are earlier and intense than those in the susceptible cultivars (7). These mechanisms of defense depend on the activity level of the PAL (8). The response of the PAL activity in the resistant cultivars roots is faster and higher than that in the susceptible cultivars. The induction of the PAL activity is related to the cell wall carbohydrate elicitor of *Foa*. However, the elicitation of the date palm with the mycelial wall elicitor (MWE) induces identical responses of the PAL activity in the resistant and susceptible cultivars. The differential induction of the defense mechanisms in the resistant and susceptible cultivars is not related to the difference in induction of the PAL activity, but to the suppression of its elicitation in the susceptible cultivars by a soluble protein suppressor produced constitutively by *Foa* (9). The differential behaviour of the date palm cultivars to *Foa* seems to be related to pathogen suppressor which constitutes a determining pathogenicity factor of the host susceptibility.

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La Gestion Participative des Ressources Génétiques du Palmier Dattier : Un projet prometteur pour la Conservation des Ecosystèmes Oasiens du Maghreb

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Mots Clés : Palmier dattier, Variétés, Bayoud, dattes, commercialisation, oasis/palmeraies

Résumé: Les programmes de recherches sur le palmier dattier des Ministères de l'Agriculture du Maroc, d'Algérie et de Tunisie et L'Institut International des Ressources Phytogénétiques (IPGRI) ont lancé un projet sur « La Gestion Participative des Ressources Phytogénétiques du Palmier Dattier dans les Oasis du Maghreb ». Ce projet qui est financé par le Programme des Nations Unies pour le Développement (PNUD) et le Fonds pour l'Environnement Mondial (FEM), vise à pallier aux obstacles qui entravent les actions de préservation de la diversité génétique des palmiers dattiers dans les oasis du Maghreb, à savoir : 1) la menace de remplacement qui est favorisée par la multiplication, la diffusion et la plantation de quelques variétés seulement ; et 2) les forces du marché qui encouragent les agriculteurs à ne cultiver que quelques variétés de palmiers de grande valeur commerciale au détriment de toute une gamme d'autres variétés.

Le projet est axé sur des activités qui serviront à *accroître* le nombre de variétés de palmiers cultivés *in situ*, plutôt qu'à promouvoir une *augmentation des rendements* ou une *expansion* de la demande commerciale. Les activités du projet comprendront : 1) une pré-sélection *in situ* pour accélérer le processus de sélection des variétés en vue de leur multiplication; 2) l'adaptation de techniques permettant de multiplier une gamme élargie de variétés de palmiers dattiers; 3) le développement de marchés alternatifs pour les produits des palmiers, ce qui encouragera les producteurs à cultiver des variétés plus nombreuses *in situ*; 4) le renforcement des capacités nationales en

matière de négociations des droits de propriété des caractéristiques génétiques; et 5) la reproduction des meilleures pratiques du projet sur d'autres sites.

Dans le cadre d'une approche participative impliquant tous les intervenants dans le secteur du dattier, le projet envisage d'agir en concertation avec les multiples programmes et les communautés locales en vue d'une meilleure gestion des écosystèmes des oasis. Ce projet qui durera pendant cinq années (de 2001 à 2005), prévoit de constituer des équipes pluridisciplinaires mixtes qui travailleront sur une série de sites, dont deux au Maroc (La Palmeraie d'Aoufouss et de Fezouata ; un en Algérie (La palmeraie de Ghardaya) et deux en Tunisie (La palmeraie de Dégache et de Chenini Gabes).

Date palm weevil: red palm weevil (*Rhynchophorus ferrugineus*)

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The red palm weevil is one of the most destructive and dangerous pests for date palm in Asia and the Middle East. It has caused mass destruction in palm-tree plantations in Egypt and the Gulf countries. It also attacks coconut trees, sugar cane, and various ornamental trees. The red palm weevils are large insects (greater than 25 mm long). They are found over a very wide geographical area involving different climates.

This pest lays its eggs on the bark of the palm tree; the grubs eventually hatch, drill into the trunk and eat the entire inside of the tree. Under heavy attack, the tree weakens and inevitably dies. The weevils are attracted to dying or damaged parts of palms, but also attack undamaged palms. The damage is caused by the larvae who bore through the soft tissue such as the tree crown, the upper part of the trunk and at the base of the petioles. On average, females lay 260 eggs which take 3 days to hatch. The larval period takes two months and the pupal period, three weeks. These figures vary across different regions. The females use the rostrum to bore into the plant tissue to form a whole in which they lay their eggs. This occurs most frequently in crowns which have been damaged.

Control:

The challenge is to detect the presence of the weevil early enough so the tree can be saved. There are no external signs that would indicate

that a tree has been infested; the leaves remain green up to the moment the tree falls over, its insides devoured. The thumb-sized grubs make so much noise eating that if you stand next to an infested tree you can actually hear them munching their way through the trunk. Another sign of infestation is a red gelatinous substance which has a putrid odor and which leaks out as the grubs feed. But by the time the smell can be detected by humans, it's too late for the tree: it must be cut down and burnt, otherwise the larvae will begin attacking nearby trees.

In the Gulf region, agriculture experts are testing a new method of fighting the red palm weevil using a harmless fungus: the Brazilian bioactive fungus which may be an effective deterrent because it has the ability to destroy the pest in the larval stage.

Another method involves pheromones which attract the red weevil, then an insecticide in a bucket attached to the trunk of the tree would kill it. But the problem is only partially solved because the larvae continue to thrive in the trunks of the palm trees and emerge as full-grown insects.

Another strategy involves collecting mature weevils and injecting them with a poison which prevents them from reproducing and results in the death of any female they mate with. They are being implemented in UAE and Saudi Arabia.

The Ministry of Agriculture and Fisheries of UAE has introduced Acecap capsules in its Integrated Pest Management (IPM) to fight the red palm weevil.

The Acecap capsules are introduced in small holes in the trunk. The larvae are killed by the active components of the capsule that are absorbed through the trunk (each Acecap capsule contains 875 milligram of active Acephate). Each tree uses between seven to 10 capsules annually depending on the degree of infestation. A tree can be cured in two months and will stay healthy for a year. Acecap capsules are used in Saudi Arabia, Kuwait and Oman.

The Department of Agriculture and Fisheries of UAE set up a technical committee to help fight the red palm weevil. Its directives include using nematodes to fight the larvae. The nematode is injected into the trunks of infected palm trees. Once inside, they remote-sense the weevils, penetrate into them and then release a deadly bacterium which kills them through blood poisoning within 72 hours. To concentrate the destructive weevils in one place and kill them, the project is using two naturally occurring

substances known as aggregation pheromones and kairomones. Pheromones are chemical compounds produced in minute quantities by male weevils which cause them to gather in a hotspot. Kairomones are compounds emanating in tiny quantities from the fresh scars of trees that have been recently pruned. These two compounds are used to lure, trap and kill the weevils in mass quantities. But first the team has to locate the infected palm groves. By using satellite remote sensing and imaging technology they aim to build up a comprehensive picture of the weevils' geographical distribution across Saudi Arabia. Once a weevil infestation is located from the air through color changes, the priority is to eradicate the focus and prevent the pest from spreading to healthy plantations.

In Israel, dogs (golden retrievers) with a sense of smell 60 times more receptive than that of humans, are used to detect the scent of the red palm weevil's slime. Improbable ? Perhaps not, since there are precedents; in Europe, German shepherds have been trained to find gypsy moths and the US Department of Agriculture's "Beagle Brigade" has been taught to locate cotton bollworms.

Date Cake

Contributed by Vicki S.

1 cup chopped dates
1 cup finely chopped nuts
1 teaspoon soda
1 cup boiling water poured over and let cool

1 cup sugar
pinch of salt
1 Tablespoon butter
1/2 teaspoon baking powder
1 egg
1 1/2 cups flour

Blend second ingredients and add to the first mixture and bake.

Spread or filling for cake:

1 cup dates
1 cup coarsely chopped nuts
1/2 cup boiling water. Boil to thicken a little.
Spread over cake when cool. You can add a spoonful of whipped cream on each piece when served.

Events

DPGN:

The Date Palm Global Network was officially established during the meeting held at Al-Ain (UAE). Four working groups were established and these are:

Germplasm and Propagation.
Production.

Pest and Diseases Management.

Post Harvest Technologies and Marketing.

The report with all details about the DPGN will be sent to the DPGN newsgroup (www.hayougroups.com/group/dpgn) as soon as it is available from the coordinator (Dr. A. Zaid).

International conference:

An international conference on date palm is organized by the Emirates Center for Strategic Studies and Research (ECSSR). The conference was initially planned for May and is now postponed to 16th-18th June 2002.

Contact address: ecssrconf@ecssr.ac.ae

A tentative program is available on the web at the DPGN newsgroup.

Note to the authors

Authors should send their contributions as attached files (Word, Excel) and their illustrations under JPG format. Authors are solely responsible for the content of their articles.

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