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SHORT NOTE

Identification and inheritance of aphid (*Aphis gossypii* Glover (resistance in melons (Cucumis melo L.)

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The cultivated cucurbits represent an important group of vegetables grown and consumed throughout the world (Munger and Robinson, (1991). In the Sudan, watermelon (*Citrullus lanatus* Thunb) is the most important (*Cucuntis melo* Var. *felexuosus*). The immature fruits of snake Ion are utilized in salads in place of the more universally distributed under. Land rases of melon used to dominate over most of the major wing areas, particularly those along the White Nile banks stretching between Dueim, Rabak, Kosti and Gebellein.

In the past two decades, high yielding top quality melon cultivars introduced from U.S.A. and Europe such as Ananas and Galia are quickly replacing the poor quality land races.

Various pests and diseases attack melons and snakemelon affecting both productivity and quality. Aphids are among the most widely spread and destructive pests of cucurbits, and can cause substantial damage (ugh direct feeding on plant juices, or by acting as vectors of plant pathogens (Ware and Mc Collum, 1980).

Aphids, are known to be vectors of more than twelve destructive viral Diseases. Plant resistance, as a method of insect control, offers many advantages and can be in some cases the only effective, practical or economical control method. Hence. furnishing the farmer with melon and sakemelon cultivars resistant to aphids would have positive effects on productivity and quality. Resistance will also reduce dependence on chemicals and the cost of applying such poisons in addition to eliminating the hazzards to the environment and making the products available at lower prices to the consumer.

The major objective of this research is to identify a source of resistance to aphids and to study its mode of inheritance.

Field experiments for screening some cultivars and accessions of *C.melo* L. for aphid resistance were conducted over three seasons: Winter 1995/ 96 autumn 1995 and winter 1996/97,in the premises of the University of Gezira research farm (latitude 14^0 6' N, longitude 33^0 $38^{0'}$ E), Wad Medani, Sudan.

A collection of land races, commercial cultivars and breeding lines from different sources were used in this study to locate source for aphid resistance, these were:

i. eighty rand races of *Cucumis melo* L. collected from different regions around the country, particularly from the major melon areas of the White Nile State.
ii. two breeding lines Margot and Virgos (Charentais type cantaloupes claimed resistant to aphid and acquire the Vat gene) (Thomas, 1990).
iii. commercial melon cultivars (Ogen and Ananas) and the snake melon cultivar (Silka).
iv. a highly susceptible check "Vedrantais" (susceptible cantaloupe charentais line).

The material was evaluated for aphid resistance using a scale of 1-8, where:

7-8: denotes high resistance where nil to very few aphids were found on leaf surface.
5 -6: intermediate resistance denotes up to 25% infestation of leaf area.
3-4: low resistance up to 50% infestation of leaf area.
I -2: susceptible: high leaf area infestation of 75% or more.

In order to prepare and make a build up of aphid population, seeds of susceptible melon cultivars, (Vedrantais and Ananas) were sown in 25 cm diameter pots in an isolated area in the nursery. One month later, the number of plants was reduced to 3/pot. Apterous, viviparous aphid females collected from infested melon plants were deposited on the leaves and left to multiply.

Laboratory experiments were carried out in a plant growth cabinet adjusted at conditions most favorable for aphid colonization and multiplication (temperature of 25^0C and relative humidity of 60%) (Yoshida and Iwanaga, 1991).

As explained by Pitrat and Lecoq (1980) nonpreference was evaluated on plantlets (15-20 days after sowing) by the number of adults remaining 24 hours after the deposition of 10 apterae adults /plant. Plants with 7 or less adults rated as resistant and plants with more than 8 adults were rated were susceptible.

The material evaluated in the following:

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i. Two commercial melon cultivars (Ananas and Ogen.), and the snake melon breeding line (Sika).
ii. Susceptible check (Vedrantais).
iii. Resistant cultivars (Margot and Virgos) .
iv. F_1S of Virgos x Ananas, Virgos x Ogen and Virgos x Silka.
v. BC_1S of F_1 x Ananas , F_1 x Ogen, and F_1 x Silka.
vi. BC_2S of the above progenies.

At the end of the screening experiment, resistant segregants were identified, transplanted and backcrossed to the recurrent parents.

Pearson's x^2 test was used to confirm the previous findings of Pitrat and Lecoq (1980) that aphid resistance is controlled by a single dominant gene.

The resistance means for 76 land races were between 2-4 and accordingly were classified of low resistance to susceptible (Data not shown). Two land races (UG 104, UG 115) scored resistance means ranging between 4 and 5, were classified as having low resistance. Two land races (UG 103 and UG 175) scored resistance means of 1.65 and 1.6 respectively, were classified as highly susceptible. The susceptible check 'Vedrantais' had scored a resistance mean of 2.0. The most susceptible accession UG 175 was stunted, contaminated with honey dew secretions, and developed the characteristic downward curling of leaves. As expressed by Bohn et.al (1973), freedom of leaf curling is part of the expression of resistance to attack by the aphids. No resistance was detected in the commercial melon and snakemelon cultivars. The commercial cultivars and Vedrantais were found susceptible, whereas Virgos and Margot proved to be resistant (Table l)

Table l. Screening melon and snakemelon cultivars for resistance to *Aphis gossypii* in growth cabinet.

Accession	Total	Resistant	Susceptible
Ananas	27	00	27
Ogen	30	00	30
Silka	24	01	23
Virgos	24	24	00
Margot	20	20	00
Vedrantais	30	00	30

Evaluation of the commercial susceptible cultivars, F_IS , BC_IS and BC_2s is presented in Table 2. Crosses between susceptible parents and the donors, Virgos and Margot gave F_IS with resistance equivalent to that of donors. Backcrosses to the susceptible parents segregated into a l: I ratio.

Pearson's x^2 test was calculated for testing the fitness to l: I ratio. Chi- square values in each class showed non significant differences between the number of plants in each class. Such results indicated that a single dominant gene controls the resistance to colonization of melon and snakemelon by *Aphis' gossypii*. The present findings confirmed that of Pitrat and Lecoq (1982) who reported that a single dominant gene symbolized by VAT (Virus Aphid Transmission Resistance) controls melon resistance to colonization by aphids.

Table 2. Reaction of melon cultivars, Ananas and Ogen and Snakemelon cultivar Silka their F_IS with Virgos and Margot and their backcrosses to infestation by *Aphis gossypii* in Summer of 1997.

Generation	Total	Observed		Expected	X^2
		Resistant	Susceptible	Ratio	value
Ananas	27	0	27	0:1	
F_I(AN x Virgos(	22	22	0	1:0	
BC_I(AN x Virgos(	26	II	15	1:1	0. 62 NS
BC_2(AN x Virgos(	20	8	12	1:1	0.80 NS
F_I(AN Margot)	30	30	0	1:0	
BC_I(AN	25	10	15	1:1	1. 00 NS
BC_2(AN x Margot)	18	7	11	1:1	0.88 NS
Vedrantais	30	0	30	0:1	

Continued Table 2

Ogen	30	0	30	0:1	
F_1(Ogen x virgos)	27	27	0	1:0	
BC_1(Ogen x Virgos)	22	9	13	1:1	0. 27 NS
BC_2(Ogen x Virgos)	20	8	12	1:1	0.80 NS
F_1(Ogen x Margot)	35	35	0	1:0	
BC_1(Ogen x Margot	18	7	11	1:1	0. 88 NS
BC_2(Ogen x Margot	20	9	11	1:1	0.20 NS
Vedrantris	30	0	30	0:1	
Silka	24	1	23	0:1	0. 88 NS
F_1(Silka x Virgos)	28	28	0	1:0	0.72 NS
BC_1(Silka x Virgos)	22	10	12	1:1	
BC_2(Silka x Virgos	22	9	13	1:1	0. 22 NS
F_1(Silka x Margot)	32	32	0	1:0	0.92 NS
BC_1Silk x Margot)	18	10	8	1:1	
BC_2(Silka x Margot)	27	11	16	1:1	
Vedrantais	30	0	30	0:1	

$X^2 = 3.84$ for $P \leq 0.05$ NS = Not significant

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