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SHORT COMMUNICATION

SCREENING OF SWEET POTATO ACCESSIONS FOR RESISTANCE TO *Tetranychus* spp. MITES

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ABSTRACT

One hundred and twenty clones of sweet potatoes from the CNPHortaliças/EMBRAPA collection were screened for their relative susceptibility to spider mites (*Tetranychus* spp.) under field conditions. Four clones (BDI-001, BDI-004, BDI-009 and BDI-010, released as cultivars under the names Brazlândia Roxa, Brazlândia Branca, Brazlândia Rosada and Coquinho, respectively) were used as standards for "medium resistance" (M). Wide differences in mite susceptibility were found among clones: 89 were rated as medium resistant (M), 19 as highly resistant (R) and 8 as highly susceptible (S). The highest degree of mite resistance was found in BDI-053 (originally collected in Brasília - DF). All but two of the susceptible accessions were foreign introductions.

INTRODUCTION

The sweet potato (*Opomoea batatas* (L.) Lam.) is grown in most of the tropical and subtropical regions of the earth, where it is an important staple for subsistence farmers (Jones *et al.*, 1986). It is widely appreciated in Brazil, where it is the fourth most popular vegetable crop (Miranda *et al.*, 1984). The vines as well as the roots can be fed to livestock; in addition, the roots are an important source of

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industrial starch, and the plant's potential for fuel alcohol conversion is under study in many countries, including Brazil (Miranda *et al.*, 1984; Jones *et al.*, 1986).

The major pests that occur in sweet potatoes in Brazil are the root borer *Euscepes postfaciatus* (Coleoptera, Curculionidae), the beetles of the genus *Diabrotica* sp, especially *D. speciosa* (Coleoptera, Chrysomelidae), and the crown borer *Megastes pusialis* (Lepidoptera, Ayralidae) (Miranda *et al.*, 1984). In addition, other pests can occur (Gallo *et al.*, 1970; Peixoto and Miranda, 1984; Miranda *et al.*, 1984): *Sternocolaspis quatuordecincostata* (Coleoptera, Chrysomelidae), *Conoderus* sp. (Coleoptera, Elateridae), *Empoasca fabalis* (Homoptera, Typhlocibidae), *Agrotis ypsilon* (Lepidoptera, Noctuidae), *Discinetus* spp. (Coleoptera, Scarabaeidae).

Mites are not usually recognized as important pests of sweet potatoes (Miranda *et al.*, 1984). It is possible, however, that wide differences in response to mite infestation might occur among different sweet potato clones, as it has been demonstrated for other sweet potato pests (França *et al.*, 1983; Jones *et al.*, 1986).

This paper reports on differences in tolerance to mites of the genus *Tetranychus* spp. (Acarina, Tetranychidae) among clones of the sweet potato collection of the CNPHortaliças/EMBRAPA in Brasília-DF.

MATERIALS AND METHODS

One hundred and twenty clones from the sweet potato collection of the CNPHortaliças/EMBRAPA were tested in Brasília - DF for their response to mite infestation under field conditions during the dry season of 1984. The trial was set up in an augmented randomized complete block design (Federer, 1956), with 12 blocks. Each block contained four check (replicated) treatments (BDI-001, BDI-004, BDI-009 and BDI-010, released as cultivars under the names Brazlândia Roxa, Brazlândia Branca, Brazlândia Rosada and Coquinho, respectively); in addition every block contained up to ten unreplicated entries, each from a different clone from the collection. Ten cuttings spaced 40 cm from each other comprised one plot. Planting was done on May 5, 1984, and evaluation of *Tetranychus* sp. infestation was performed on August 20-21, 1984. This period corresponded to the normal dry season in the area.

A scale for mite infestation and damage was established as follows:

1 = little or no attack on most plants
2 = all plants infested, but low population and no apparent injury to the plant
3 = large population of mites (> 20 per leaf), a few leaves severely distorted
4 = large population of mites, almost all leaves severely distorted, stunting of plant growth.

Repeated observations were by six independent evaluators, who scored each plot according to the above scale. The plot score was taken as the mean score of the six evaluators.

The replicated treatments, represented by four cultivars released after years of superior performance in field trials (Miranda, 1983; Peixoto and Miranda, 1984), were taken as standards of "medium resistance (M)" to mites. Clones whose adjusted means differed from the mean of the standard cultivars (MSC) by the Bonferroni test at $\alpha = 0.05$ were considered to be highly resistant (R) or highly susceptible (S), respectively, if the means were lower or higher than MSC.

RESULTS AND DISCUSSION

Table I reports the recorded mite infestations for the 120 clones screened. The check treatments (clones BDI 001, BDI-004, BDI-009 and BDI-010) averaged a mite infestation score of 2.81, with a range from 2.66 (BDI-004 = Brazlândia Branca) to 2.93 (BDI-001 = Brazlândia Roxa). The limits of the Bonferroni test ($\alpha = 0.05$) were 2.02 and 3.60. Eight clones with scores higher than 3.60 were rated as highly susceptible (S); 19 clones with scores lower than 2.02 were rated as highly resistant (R); the remaining 89 clones were rated as medium resistant (M). The highest degree of mite resistance was found in clone BDI-053, originally collected in a domestic garden a few meters from the main building of the CNPHortaliças, in Brasília - DF. All but two of the susceptible accessions were foreign introductions (USA, Argentina).

The majority of the clones tested were collected in domestic (non-commercial) gardens in a wide range of Brazilian regions. Even though no attempt was ever made to systematically recover representative samples of sweet potato clones in Brazil, it is clear that Brazilian domestic germplasm is highly variable and includes good sources of mite tolerance. This was also true for sources of resistance to soil insects (Miranda, 1983; França *et al.*, 1983) and to root-knot nematodes *Meloidogyne incognita* and *M. javanica* (Huang *et al.*, 1986).

The results demonstrate that, though abundant sources of mite tolerance are available, evaluating for mite tolerance may be an important step in breeding or varietal testing, so as to avoid extreme susceptibility. This is particularly important in recurrent selection schemes, where new genic combinations are often continuously produced from foreign germplasm originally unadapted to Brazilian conditions, such as the material originated by Jones (Jones *et al.*, 1986) in South Carolina/USA), which is being used at EMBRAPA's program.

Table I - Responses of sweet-potato clones from the CNPH/EMBRAPA collection to mites of the genus *Tetranychus* sp. under conditions of natural field infestation. August 1984, Brasília, DF.

Accession number or name	Site of origin or collection	Least square means[a]	Mite resistance[b]
BDI - 001 (= Brazlândia Roxa)	DF	2.93	M[c]
BDI - 002	DF	2.27	M
BDI - 003	DF	1.77	R
BDI - 004 (= Brazlândia Branca)	DF	2.66	M[c]
BDI - 005	DF	2.44	M
BDI - 006	DF	2.94	M
BDI - 007	DF	2.94	M
BDI - 008	DF	2.77	M
BDI - 009 (= Brazlândia Rosada)	DF	2.72	M[c]
BDI - 010 (= Coquinho)	PB	2.94	M[c]
BDI - 011	GO	1.44	R
BDI - 012	MG	1.61	R
BDI - 013	PE	1.61	R
BDI - 014	MG	1.44	R
BDI - 015	MG	1.90	R
BDI - 016	MG	1.73	R
BDI - 017	MG	2.56	M
BDI - 018	MG	2.73	M
BDI - 019	MG	2.73	M
BDI - 020	MG	1.57	R
BDI - 021	MG (USA?)	2.73	M
BDI - 022	MG	2.73	M
BDI - 023	MG	2.73	M
BDI - 024	MG	2.73	M
BDI - 025	MG	2.94	M
BDI - 026	MG (USA?)	3.27	M
BDI - 027	MG	2.27	M
BDI - 028	MG	3.10	M
BDI - 029	DF	1.61	R
BDI - 030	MG	3.10	M
BDI - 031	MG (USA?)	3.10	M

Continued

Table I - Continued

Accession number or name	Site of origin or collection	Least square means[a]	Mite resistance[b]
BDI - 032	MG	2.61	M
BDI - 033	MG	1.94	R
BDI - 034	PB	2.76	M
BDI - 035	MG	1.82	R
BDI - 036	MG	2.65	M
BDI - 037	PB	2.82	M
BDI - 038	DF	2.48	M
BDI - 039	DF	2.82	M
BDI - 040	DF	2.73	M
BDI - 041	DF	2.48	M
BDI - 042	DF	1.98	R
BDI - 043	DF	1.81	R
BDI - 044	DF	1.98	R
BDI - 045	AM	1.81	R
BDI - 046	AM	3.15	M
BDI - 047	AM	2.82	M
BDI - 048	DF	1.98	R
BDI - 049	DF	2.98	M
BDI - 050	MG	2.48	M
BDI - 051	DF	2.65	M
BDI - 052	DF	2.82	M
BDI - 053	DF	0.98	R
BDI - 054	DF	2.65	M
BDI - 055	MG	2.65	M
BDI - 056	MG	2.48	M
BDI - 057	PE	2.90	M
BDI - 058	GO	2.40	M
BDI - 059	DF	2.73	M
BDI - 060	Argentina	2.40	M
BDI - 061	Argentina	3.07	M
BDI - 062	Argentina	3.07	M
BDI - 063	Argentina	3.37	S
BDI - 064	Argentina	3.90	S

Continued

Table I - Continued

Accession number or name	Site of origin or collection	Least square means[a]	Mite resistance[b]
BDI - 065	Argentina	3.90	S
BDI - 066	DF	3.07	M
BDI - 067	SC	3.07	M
BDI - 068	SC	2.73	M
BDI - 069	DF	2.06	M
BDI - 070	PI	2.90	M
BDI - 071	RS	3.23	M
BDI - 072	RS	3.56	M
BDI - 073	PA	2.40	M
BDI - 074	PA	3.23	M
BDI - 075	PA	3.07	M
BDI - 076	PA	2.82	M
BDI - 077	PB	2.15	M
BDI - 078	PB	2.31	M
BDI - 079	PB	3.31	M
BDI - 081	DF	2.81	M
BDI - 082	PB	2.98	M
BDI - 083	DF	1.65	R
BDI - 084	GO	2.31	M
BDI - 085	MS	3.65	S
BDI - 086	MS	2.36	M
BDI - 087	MS	1.52	R
BDI - 088	MS	3.02	M
BDI - 089	MS	2.52	M
BDI - 090	MS	2.36	M
BDI - 091	GO	2.69	M
BDI - 092	MS	2.69	M
BDI - 093	PR	2.69	M
BDI - 094	GO	2.36	M
BDI - 097	DF	2.52	M
BDI - 098	Taiwan	2.73	M
BDI - 099	GO	3.07	M
BDI - 100	AM	2.57	M

Continued

Table I - Continued

Accession number or name	Site of origin or collection	Least square means[a]	Mite resistance[b]
BDI - 101	RR	2.40	M
BDI - 102	RR	3.90	S
BDI - 103	GO	3.07	M
BDI - 104	GO	3.57	M
BDI - 105	USA	3.07	M
BDI - 106	USA	2.90	M
BDI - 107	USA	3.23	M
BDI - 108	USA	3.98	S
BDI - 109	USA	3.81	S
BDI - 110	USA	3.15	M
BDI - 111	USA	2.98	M
BDI - 112	USA	2.31	M
BDI - 113	MG	2.98	M
BDI - 114	USA	2.65	M
BDI - 115	USA	2.15	M
BDI - 116	USA	3.81	S
BDI - 117	USA	3.48	M
BDI - 118	USA	2.90	M
BDI - 119	BA	2.90	M
BDI - 120	BA	2.23	M
BDI - 121	BA	2.57	M
BDI - 122	BA	2.73	M
BDI - 124	DF	2.23	M

[a] Adjusted mean scores for mite infestation

1 = little or no infestation

4 = largest infestation score

[b] Mite resistance:

R = resistant = mite infestation significantly lower than the mean of the treatments by the Bonferroni test ($\alpha = 0,05$).

M = medium resistance = mite infestation not different from the mean of the check treatments.

S = susceptible = mite infestation significantly higher than the mean of the check treatments.

[c] Check (replicated) treatments.

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RESUMO

Cento e vinte clones de batata-doce da coleção do CNPHortaliças/EMBRAPA foram avaliados para resposta à infestação de ácaros de gênero *Tetranychus* spp. sob condições de campo. Quatro clones (BDI-001, BDI-004, BDI-009 e BDI-010, liberados como cultivares sob os nomes de Brazlândia Roxa, Brazlândia Branca, Brazlândia Rosada e Coquinho, respectivamente) foram usados como padrões de média resistência (M). Uma ampla gama de susceptibilidade aos ácaros foi detectada entre clones: 89 deles foram classificados como mediamente resistentes (M), 19 como altamente resistentes (R) e 8 como altamente susceptíveis (S). O mais alto grau de resistência foi encontrado no clone BDI-053, originalmente coletado em Brasília - DF. Seis dos oito acessos susceptíveis foram introduzidos de outros países (USA, Argentina).

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