Revista Ceres 44(251):124-127.1997

COMUNICAÇÃO

THE ACTIVITY OF *Mucuna deeringiana* AND *Chenopodium ambrosioides* CRUDES EXTRACTS UPON *Meloidogyne incognita* RACE 3[1]

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Velvetbean (*Mucuna deerigiana*) is an annual crop used as green manure which provides benefits such as a small reproduction of *Meloidogyne incognita* and *Meloidogyne javanica*, and improvement of soil conditions (*4*).

Chenopodium ambrosioides L. is known in Brazil by the denominations of *erva-de-santa-maria*, *mastruço*, *mata-cabra*, *erva-das-lombrigas* and *erva-mata-pulgas*. It is an annual erect and herb-like plant with a strong and characteristic smell. It is commonly found in gardens, empty lots and alongside highways. It possesses medicinal and insecticidal properties (*3*). It is often used in veterinary medicine to control ascarid in dogs, pigs, cats and sometimes tapeworm in birds (*1*). The plant, when fresh, is used as a household insecticide which repels fleas and beetles.

This study presents information on behavior of crude extracts of dif-

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ferent polarities from the aerial part (leaves and stems) and from the roots of *M. deerigiana* and *C. ambrosioides* to *M. incognita*.

The seeds of *M. deerigiana* were acquired from the Agricultural Institute of Campinas (IAC) (São Paulo) and *C. ambrosioides* were obtained privately. They were planted on the Coffee Farm of the Federal University of Viçosa, Minas Gerais.

The aerial parts (leaves and stems) of the plants were separated from the roots. They were air-dried at 35 °C and then pulverized, furnishing 800 g of powder (aerial parts) and 250 g of powder (roots) for *M. deerigiana* and 300 g of powder (aerial parts) for *C. ambrosioides*. They were successively extracted with hexane chloroform, ethyl acetate/acetone 4:1 (v/v) and ethanol/water 4:1 (v/v). The crude extracts were dried in a rotary evaporator at low temperature.

Eggs masses obtained from pure culture of *M.* incognita were used to evaluate the crude extracts which were suspended in distilled water at a concentration of 1% with two drops of Tween 20. Three mL of each crude extract were added to hatching chambers consisting of Petri plates containing facial tissue upon which 10 egg masses were placed. There were five replicates per treatment. Counting was done 48, 96 and 144 hours after exposure to the extracts in the Peters counting chamber.There was a reduction in egg hatching in the chloroform, ethyl acetate/acetone and ethanol extracts.

Table 1 shows the results obtained with the extracts hexane, chloroform, ethyl acetate/acetone and ethanol/water from aerial parts of *M. deerigiana.* The ethanol/water was the most active extract.

Table 2 shows the results obtaine d in *M. deerigiana* roots. The ethanol/water extract was the most active.

TABLE 1 - Number of juveniles of *M. incognita* strain 3 ecloded in crude extracts of aerial parts of *M. deerigiana*. Average of five replicates.

Crude extracts	Average*
Hexane	4450 a
Chloroform	1964 b
Ethyl acetate/acetone 4:1 (v/v)	1996 b
Ethanol/water 4:1 (v/v)	956 b
Control	3585 a

*Average with the same letter are not different at 5% of probability (Tukey's test).

TABLE 2 - Number of juveniles of *M. incognita* strain 3 ecloded in crude extracts of *M. deerigiana* roots. Average of five replicates.

Crude extracts	Average*
Hexane	2005 a
Chloroform	2418 a b
Ethyl acetate/acetone 4:1 (v/v)	2926 b c
Ethanol/water 4:1 (v/v)	1041 d
Control	3585 c

*Average with the same letter are not different at 5% of probability (Tukey's test).

Table 3 shows the results obtained with the extracts hexane, chloroform and ethanol/water obtained from the aerial parts of *C. ambrosioides*. The ethanol/water was the most active extract.

TABLE 3 - Number of juveniles of *M. incognita* strain 3 ecloded in crude extracts of the aerial parts of *C. ambrosioides*. Average of five replicates.

Crude extracts	Average*
Hexane	40 a
Chloroform	20 a
Ethyl acetate/acetone 4:1 (v/v)	1796 b
Ethanol/water 4:1 (v/v)	843 c
Control	2482 b

*Average with the same letter are not different at 5% of probability (Tukey's test).

To study the nematostatic and/or nematicide effects, the crude extracts were withdrawn, with distilled water being added to the egg masses, which remained incubated for 48 hours at 24 °C. The crude extracts obtained from the aerial part as well as those from the roots of *M. deeringiana* presented juveniles with normal movement and eclosion after exposure to the crude extract was tested. However, for the crude extracts obtained from the aerial part of *C. ambrosioides*, the hexane, chloroform and ethanol/water crude extract showed nematostatic activity with

paralyzation of juvenile hatching when the eggmasses were in contact with the crude extracts.

The nematostatic activity of hexane and chloroform extract might be ascribed to the presence of ascaridole (*2*), an essential oil common in *C. ambrosioides*. The ethanol/water extract, however, seems to contain one (or more) nematostatic principle, since the water insoluble ascaridole is not present anymore. Analyzing the chloroform, ethyl acetate/acetone and ethanol/water crude extracts obtained from the aerial part and ethanol/water crude extract obtained from the roots of *M. deeringiana*, it can be observed that substances which, acting separately or together, reduce the hatching of juvenile also seem to be prsent.

RESUMO

(AÇÃO DE EXTRATOS BRUTOS DE *Mucuna deeringiana* E *Chenopodium ambrosioides* SOBRE A RAÇA 3 DE *Meloidogyne incognita)*

Foram estudados os extratos brutos das partes aéreas e raízes de *Mucuna deeringiana* e partes aéreas de *Chenopodium ambrosioides* para evidenciar a ação nematicida e, ou, nematostática frente ao nematóide *Meloidogyne incognita* raça 3. Os extratos clorofórmico, acetato de etila/acetona e etanol/água de *M. deeringiana* da parte aérea e o extrato etanol/água das raízes reduziram a eclosão de juvenis de segundo estádio do nematóide *M. incognita* raça 3, porém não apresentaram efeito nematostático e nematicida. Os extratos hexânico, clorofórmico e etanol/água da parte aérea de *C. ambrosioides* foram os mais ativos, reduzindo a eclosão de juvenis de segundo estádio do nematóide *M. incognita* raça 3, porém apresentando atividade nematicida.

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