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SOME NEMATOLOGICAL INVESTIGATIONS ON SNAKE TOMATOES (*TRICHOSANTHES CUCUCUMERINA)*

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INTRODUCTION

The snake tomato (*Trichosanthes cucumerina)* voital is a native of China, but now widely distributed in southeastern Asia and West Africa (Imoyera, 1989). *Trichosanthes cucumerina* belongs to the family of Curcurbitaeceae and the fruits are used in the preparation of soups while the leaves are used for medicinal purposes (Burkil, 1985).

Snake tomatoes are a good source of vitamins A and C and could help in alleviating nutritional deficiencies in many developing countries.

In Nigeria, snake tomatoes are grown mainly in home gardens or around fences on which it trails. Most often the plant is grown in water logged areas which enhances its susceptibility to the root knot nematode *Meloidogyne* species.

The aim of the study is to reawaken public awareness to the nutritional importance of snake tomatoes. and to investigate the effects of the root knot nematode on the growth of the plant.

MATERIALS AND METHODS

2.1 Preliminary investigations

Soil samples were randomly collected from field for quantitative assessment of nematodes present in the field. Nematode extraction was done using Beerman tray method as described by Townshed (1962). Nematodes present in soil were then studied under a compound microscope. Specific identification was possible with the use of pictorial key to genera plant nematodes by Main and Lyon (1975).

2.1 Source of Inoculum

Galled roots of *Celosia* plants were collected form the National Horticultural Research Institute in Ibadan. Roots were chopped into smaller pieces and put into a 0.5% solution of sodium hypochlorate (NaOCl). The conical flask was vigorously shaken for 4 mins and the resultant solution was decanted through 200mesh sieve and 500 mesh sieves. The resultant filtrate contained the numerous nematode eggs, which was rinsed with distilled water and used for the inoculation of the snake tomato plants.

2.3 Identification of Root-knot Nematode on Inoculated Plants

Seeds of *T. cucumerina* were sun-dried and planted in soil at the rate of two seeds per hole. At three weeks, each plant was inoculated with root knot nematodes. Exposing the area around the plant roots were inoculated plants and the inoculum was introduced with the aid of a syringe. Each inoculum was estimated to contain about 1,500 eggs and first stage nematode juveniles using a Downcaster's counting dish.

A row of plants were left uninoculated, to act as the control. All the plants were regularly watered at 4 weeks, plants were staked with long sticks to prevent them from falling down.

At maturity, fruits were harvested and plants uprooted for the determination of galling indices. The heavily invaded roots were examined under a high-powered microscope. And roots were dissected and stained with lactophenol cotton blue to identify the various stages of the root-knot nematode under a compound microscope.

RESULTS AND DISCUSSION

Five genera of nematodes were extracted from the soil sample collected. These nematodes were identified as : *Meloidogyne spp, Tylenchus spp, Pratylenchus spp, Longidorus spp* and *Xiphenema spp.*

As indicated in Table 1,the most frequently occurring plant parasitic nematode is the root knot nematode, while , *Longidorus spp* and *Xiphenema spp* are important in the transmission of plant viral diseases.

Also snake tomato plants that were inoculated with 1,500 nematode juveniles showed premature dropping of flowers when compared with the control plants. Brown, necrotic lesions seen in dissected roots might result from the death of plant cells caused by the feeding activities of the nematode (Adesiyan *et al,* 1990.)

The presence of small sized galls on the tips of infected roots also confirms the infection of snake tomatoes by the root-knot nematodes in soil (Kirby 1977). The overall implications are that about 60% of flowers simply dry off or produce small fruits.(Fig1).

From the results obtained, it is known that plant parasitic nematodes are always present in soil and could be damaging crops. There is therefore a need for the use of nematode control methods to maximize the yield of *T.cucumerina.*

Table 1: Number of Plant Parasitic nematodes in 200ml of Soil

NEMATODE	FREQUENCY	PERCENTATGE
Meloidogyne spp	28	56
Pratylenchus pp	48	16
Tylenchus spp	8	16
Xipinena spp	3	6
Longidorus spp	3	6
TOTAL	50	100

FIG 1: Nematode Infected Snake Tomato Plants with wilting leaves and shrunk fruits

CONCLUSION AND FUTURES RESEARCH NEEDS

Snake tomatoes have been known by many people in Nigeria for over fifty years but now the plant is gradually going into extinction in the Nigerian agriculture (Oyede, 1987).

In Nigeria, tomatoes are usually purchased fresh or in imported form as tinned tomatoes. However, the dire economic situation in which Nigeria presently finds herself calls for self-examination and a rejuvenation of local substitutes. *T. cucumerina* is used as a substitute to the imported tinned tomatoes because of its sweet tasting, and blood red center pulp when ripe, thus saving some foreign reserves for the country..

Snake tomatoes can be used in all types of cooking to enhance the flavour and taste of soups. Moreover, the leaves and seeds are known to be medicinal. Burkil (1985) reported the antihelmintic properties of *T. cucumerina* seeds, while oil extracted from the seeds are also used by the local people as purgatives and it is a good source of vitamin A and C thus helping to alleviate nutrient deficiencies among the less privileged.

However, there are little information on *T. cucumerina* and the plant is gradually going into extinction in the country. It can therefore be suggested that further research studies should be carried out on *T. cucumerina* to study the most appropriate crop production and protection practices that could enhance its maximum production and health benefits for the present and future generation.

REFERENCES

Adesiyan, S.O; F.E Caveness; M.O Adeniji and *B. Fawole*. 1990: Nematode pests of Tropical Crops (Heinemann) pg 1 – 2.

Burkil, H.M. 1985: The useful plants of tropical Africa 2nd Edit. Vol. 1 pg 72 – 75.

Dutta, C.C Botany, for Degree Students 5th Edit. Published by Oxford Univ. Press Delhi Bombay Madras. Pg 731.

Imoyer, M.O. 1989. Preliminary investigation on snake tomato (*Trichosanthes cucumerina Linn)* B.Sc Project University of Ibadan, Ibadan, Nigeria.

Kirby, M.F. 1977. Banana Burrowing Nematode South Pacific Commission Advisory Leaflet 3.

Mai, W.F and *Lyon H.H.* 1975. Pictorial key to genera of plant parasitic nematodes Cosstock Pub. Assoc Ithaca N.Y 219 pp.

Oyede, O. A. 1987. Quality evaluation of tomato ketch up prepared from snake tomatoes. HND Project Report of Food Technology Ogun State Polytechnic Abeokuta Nigeria.

Taylor, A.L and *J.N Sasser* 1978, Identification and control of root knot nematode (Meloidogyne spp).

Townsend J.L. 1962: An examination of efficiency of the Cobb Decanting and Soering Introductory Nematologica pp 273 – 300.