

NEMATODES AND MAN'S WELFARE

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1. PREAMBLE:

The theme of this Conference is Nematodes and Man's Welfare. It is necessary to start by defining the word NEMATODE. What is a Nematode?

2. THE NEMATODE

Zoologically defined, a nematode is a "triploblastic pseudocoelomate, usually filiform Eumetazoan with a secondarily acquired radial symmetry super-imposed upon an original bilateral symmetry."

Still Zoologically speaking, nematodes belong to the one and only Phylum NEMATODA. The word Nematode is coined from two Greek words: *Nema* which means *THREAD*, and *eidos* which means *LIKENESS*.

In other words, the word NEMATODA means *THREAD LIKE*. This is because most, but certainly not all Nematodes are thread-like (filiform), with circular transverse sections (TS). Thus, in layman's language, nematodes are called thread worms or round worms or eel worms.

Although the nematodes parasitic on man had been known from ancient days, the large majority of nematodes that live in soils, and in water and plant bodies remain unknown to most people outside the Laboratories. The most frequently asked question that greets the Nematologists in the market place till today is "what is a Nematode?" This is inspite of the fact that Nematodes are not only the most numerous multicellular animals on earth (Yoloye, 1987), they, in the sheer number of their individuals outnumber all the other Eumetazoans, including the Arthropods (Ukoli, 1984; Yeates, 1987). Cobb (1914) in his historic expose of the incredible numbers and distribution of nematodes wrote: "*If all the matter in the Universe except the nematodes were swept away, our world would still be dimly recognizable... We would find its mountains, hills, valleys, rivers, lakes and oceans represented by a film of nematodes*"

By implication, this means that nematodes are present everywhere in the world, the Antics and the Antactics not excluded! It is then appropriate to examine how these trillions of nematodes affect man's welfare.

3. NEMATODES IN THE AFFAIRS OF MAN

Although scientists have tried to compartmentalize science into specialist cubicles for ease of study, there actually exist no such boundaries in nature. For instance, while all nematodes belong

to the single Phylum Nematoda, the word Nematologist is usually reserved for the specialists who study the soil, water or phytophagous nematodes while the specialists who deal with nematodes that parasitise man and his animals are recognized as Parasitologists or Heminthologists. The truth is that wherever the nematode reigns, it obviously knows not, nor cares whether it is being studied by a Nematologist or a Parasitologist or a Zoologist. To my mind, we are all Nematologists that study Nematodes in whatever their abode may be. Nematodes affect the welfare of Homo sapiens, the all wise man, by contributing to the major problems that confound humanity today, namely hunger, disease and poverty.

3.1 Nematodes and the Hunger Problem

Nematodes are categorized into four broad trophic groups. About 50% of all known nematodes are sea dwellers where they are mainly saprophagous. About 25% of them are free-living; 15% are parasitic on animals, including man, while about 10% feed on plants or are phytophagous. Since man evolved from the “hunt and gather” in the wild era, and started to concentrate his food, fiber and economic cash crops in large plantations and farms, he also inadvertently laid a beautiful dining table for plant parasites, including the nematodes.

Nematodes parasitise almost all plants on earth, feeding on their roots, stems, leaves, flowers, buds and seeds where they cause lots of diseases that result in substantial declines in food production or total crop failure. The most common destructive plant parasitic nematodes in Nigeria include the root-knot nematode, *Meloidogyne spp*, which caused total failure of the Kenaf crop in Moor Plantation, Ibadan in the 60s, and the root-lesion nematodes *Pratylenchus spp* that cause up to 27% decline in maize (*Zea mays*) production in most parts of the South Western Zone of Nigeria and beyond. The yam Nematode, *Scutellonema bradys* also takes its toll on our yam production.

In this way, nematodes contribute substantially to hunger all over the world, especially in the Tropical world. Whether they live in the soil and feed ectoparasitically on plant roots, or migrate into the plant tissue where they live and feed endoparasitically, the result is the same. They rob the farmer the fruits of his labour, and leave him hungry and miserable.

To compound his problem, nematodes also cause economic depression when they cause significant declines in his economic crops. Webster (1972) captured graphically the general misery caused by phytophagous nematodes when he wrote:

“Undoubtedly, plant parasitic nematodes are wide spread pests, are frequently the most insidious and costly, and periodically result in crop devastation and economic misery”

The general relationship between the plant host and its nematode parasites is simply illustrated in Figure 2.

3.2 Nematodes and Man's Health

While the nematodes which are parasitic on plants are not visible to the naked eyes and remain man's invisible enemies, those that are parasitic on man and his animals appear to be giants among their peers.

The truth is that some of the most dreaded and deadly diseases of man are actually caused by nematodes. Indeed, nematode diseases of man rank second to malaria worldwide, with the exception of the recent HIV/AIDS pandemic. To drive home the point, I will make a brief mention of four common examples of well-known nematode diseases of man.

3.2.1. Ascariasis:

The most common nematode ailment of man in Nigeria is ascariasis caused by the nematode called *Ascaris lumbricoides*, the common round worm, locally known as aràn or èèpà in Yoruba. *Ascaris* is a giant among its peers irrespective of the 13 meter long nematode parasite of the sperm whale. Ascariasis is a general debilitating ailment of man, which is hardly lethal although occasionally results in its host's death, especially when it completely blocks the host's intestinal lumen due to overcrowding or when its larvae migrate through its host's sensitive organs.

3.2.2. Onchocerciasis:

My second example of nematode parasite of man is the nematode called *Onchocerca volvulus*, the causal agent of the disease known as onchocerciasis or river blindness. Up to 86 million people are said to still be affected by this disease globally. But Africa alone harbours up to 20 million sufferers, 18 million of who are Nigerians. Most of these are totally blind .

3.2.3. *Dracunculus medinensis*.

My third example is *Dracunculus medinensis* literally meaning "the great dragon of Medina". The disease caused by this nematode is called dracunculiasis, commonly referred to as guinea worm. *Dracunculus medinensis* is one of the earliest known nematodes because dracunculiasis was so medically devastating in ancient times that even the bible made reference to it in Numbers 21:6 as the 'fiery serpent, the plague of the Israelites'. The guinea worm disease is still on the rampage in some parts of Nigeria even today.

3.2.4. *Wucheria bancrofti*:

Finally, the filaroid nematode, which causes elephantiasis of the scrotum as well as the legs will be considered here. Well known in Nigeria as Calabar swelling, it is called elephantiasis because the leg becomes as big as that of an elephant.

Nematode diseases of man were so devastating in the past that one feels tempted to go on and on. What about the African eye worm known as *Loa loa* what about *Ancylostomal duodenale*, the hook worm, which I understand, still affects a quarter of the world population! What about

Necator americana, literally meaning the killer of the Americans!! All of these constitute major threats to the survival of man, apart from those nematodes of veterinary importance.

3.3. Nematodes of Veterinary Importance:

It is of importance to note that nematodes also affect the health of man's animals, be it his pets such as dogs or his veterinary industry worldwide.

Among these are *Toxocara canis* of puppies, *Strongyloides stercoralis* and *Ancylostoma caninum*, which causes diarrhoea in dogs. Virtually all grazing animals such as cattle, sheep and goats suffer from nematode induced diseases, weight loss and general reduced productivity. Most, if not all of our ranging local fowls, *Gallus domestica*, carry their own burden of nematodes that include *Ascaridia galli*, which reduce their body weights and egg production with their consequent economic losses (Egunjobi, 1995).

4. CONCLUSION:

Nematodes in all their ramifications have contributed very significantly to man's woes, successfully keeping him on his tip toes in his survival battle with the lowly wormy nematodes. This submission summarises the true situation of the man-nematode relationship where the average farmer, with his own burden of nematode parasite within his body, tills his nematode – infested farm land to improve the yield of his nematode infested crop (maize) while he remains oblivious of his invisible enemy, the nematodes. However, this submission is designed to open the gate to the specialists to confirm or reject this conclusion from their fresh findings using modern scientific techniques.

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