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Helminth Parasites of Fruits and Vegetables Planted in Crop and Landscape Managent Garden College of Agricultural Sciences, Ebonyi State Universityabakaliki, Implication for Public Health.

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Abstract
The parasitological examination of soil samples extracted from the roots of pre-nursery crops of fruits and vegetables for the prevalence of soil transmitted helminths was conducted using Zinc-Sulphate floatation, centrifugation methods and microscopy respectively. Out of 1,400 soil samples and 1000 fruits examined 58% and 42% respectively were positive. The study revealed that soil transmitted parasites where implicated in their full developmental stage of adultworms, larvea and eggs respectively. These include *Capillaria, Strongyloides stercoralis, Trichuris trichuria, Hookworms, and Ascaris lumbricoides*. Their presence could be as a result of using animal dungs/feaces as organic fertilizer, direct urination and open defeacation on the farmland by students, staff, and other student farmers in the nursery. Thus contaminating the nursery and posing health problems to students, farm workers in the campus and consumers of the contaminated fruits and vegetables. However, infected students could be treated with antihelminthics while avoidance of the use of animal dungs/feaces, open defeacation and urination on the farmland will reduce the parasite presence. Students treatment on infection, can be achieved through public health awareness scheme and provision of toilet facilities and finally teach them how to wash their fruits and vegetables with salt or potassium iodide which are predisposing factors for infection.
Keywords: Helminths, Parasites, Soil, Fruits, Vegetables, EBSU.

1. Introduction

In Africa, more than half of the population do not have access to portable water and about two-thirds lack good sanitation means of excreta and urine disposal. Nigeria, like other developing countries is faced with the problem of inadequate disposal of excreta-related human waste discharged into the environment and water bodies. Agbolade *et al*, (2008). Thus, in rural farming communities of eastern Nigeria, promiscuous defecation on open fields and farm lands is still a common practice. CAS campus lack disposal facilities and their students engage on uncommon practice of indiscriminate disposal of excreta commonly called bush method. Excreta related diseases especially helminths that cause gastrointestinal problems in man rank high on the scale of disease burden in mixed populace that lack portable drinking water and good sanitation. WHO (1989) reported that inadequate sanitation, lack of access to clean potable water and poor domestic hygiene are the cause of 80% of all infectious diseases in the world and responsible for 10-25 million deaths each year, most of them under 5years age group.

These are transmitted through faecal-oral route through faecally contaminated water, food and soil. Communities characterised by poor and no hygiene and a large proportion of children will generate excreta rich in enteric pathogens Wargovich, (2000). Helminth infections are of particular concern in developing countries and many of these parasitic worms have human hosts. To highlight the actual risk to public health affecting student farmers as well as consumers of crops grown on faecally polluted soil as a result of post harvest contamination with helminths eggs, ova and adult worms were studied. The environment of this study provided conducive atmosphere for the prevalence of these soil transmitted helminthes. Montressor *et al,(2003)* also reported that moist soil and average temperature favours the fecundity of soil transmitted helminths and could suggest that this quickens their reproduction. This was carried out in farm produce from crop and landscape management nursery Ebonyi State University Abakaliki to highlight the actual implication to public health affecting student farmers as well as consumers of crops grown on focally polluted soil as a result of postharvest contamination with helminth adult worm, eggs and larvae.

2. Methods

Study Area:

Ebonyi State geographically lies between co-ordinate 70 31` and 80 30` N and between 50 40`, and 60 45` E. The climate of the area is more tropical and the vegetation characteristic is predominantly the rain forest with an average atmospheric temperature of 250-350C. There are two distinct seasons, the rainy and the dry seasons; the former stretches between April and October, while the latter occurs from November to March. The study was conducted in crop and landscape management garden CAS campus Ebonyi State University Abakaliki. The population here is made of student and staff farmers under the management of Kelechi Nwanchor. Sanitation facilities are either non-existent or grossly inadequate in this study area. Thus, defecation on open farm lands is a popular practice among students and staff due to lack of disposing facilities which ensures a predisposing factor to many parasitic diseases.

Methodology:

1400 soil samples from farm lands were collected from Crop and landscape management garden, College of Agriculture campus Ebonyi State University Abakaliki as well as fruits and vegetables from student farmers were examined for helminths eggs, ova and adultworms using the zinc sulphate flotation technique and microscopy.

3. Result and Discussion:

Soil samples from farm lands of students and staff of Ebonyi state university college of agriculture sciences (CAS) as well as fruits and vegetables harvested directly from the farm were examined for helminth eggs and larvae using Zinc-Sulphate floatation, centrifugation methods and microscopy respectively, to highlight the public health significant of using untreated domestic animal dungs as fertilizer. All the fruits and vegetables were found to be contaminated.

Out of the 1,400 soil samples and 1000 fruits examined using zinc-sulphate flotation technique and microscopy, 58% and 42% respectively were positive. Eggs of *Ascaris lumbricoides* (15%); Hookworms (11.8%); *Capillaria* (4%) and larvae of *Strongyloides stercoralis* (1.2%) were recovered from soil. The samples contained *Ascaris lumbricoides* (30.4%); Hookworms (20%); *Capillaria* (9.6%) and *Stongyloides stercoralis* (1%) respectively. Mixed parasite infections were also observed. All the fruits were found to be contaminated with one or more species of helminthes adult worm, eggs, ova or larvae, with the fruits being more contaminated (52.9%) and (47.1%) respectively. *Solanum eathiopicum* leaf recorded the highest contamination rate (23%) while *Telferia occidentalis* recorded the least contamination (8.3%). *Solanum eathiopicum* and *Solanum melongina* fruits recorded the highest contamination rate (15%) while *Lycopesicum lycopesicum* recorded the least rate of contamination (5.6%) for the fruits. Helminth ova and larvae recorded were *Ascaris lumbricoide, Capillaria,* Hookworms, *Strongyloides stercoralis* with *Ascaris lumbricoides* being the most frequently encountered (60.3%). These parasites affect human and animals and are directly linked to faecal contamination which is also reported by Simonart *et al*, (2003). The recovery of helminthic eggs and larvae on the vegetables and fruits is indeed of great public health importance. This shows that hygienic level of the consumers and the behavioural attitude of farmers in application of untreated human and animal dung as organic manure, use of irrigation source which receives raw affluent from human or animal wastes lead to the transmission of zoonotic infection as vegetables harbour the parasites through these sources, Shrestha, (2010). The contamination might have resulted from rain splashes of contaminated soil during heavy rainfall which deposit contaminated soil surface on leaves of vegetables or fallen fruits, (Agbolade, *et al*., 2008; WHO, 1980). It is not also wrong to say that heavy wind may carry dust particles on leaves and fruits. Some of the vegetables and fruits may be eaten raw or undercooked and might cause infection and disease. This is true that the consumption of raw or undercooked vegetables and fruits play a significant role in human nutrition, especially as source of vitamins (C, A, B_6) thiamine, niacin, E), minerals and dietary fibre Quebedeaux and Bliss, (1988); Quebedeaux and Eisa, (1990); Wargovich, (2000).

Special care must therefore be taken when introducing sanitation facilities that potentially increases contact between householders and excreta which may contain viable *Ascaris* ova. The risk of handling waste must be clearly identified and methods of reducing risk must be instituted wherever possible. This is because large number of students were found promiscuous in the farm yards using vegetations as cover during the exercise, this could be blamed on the non provision of toilet facilities by the campus management. Helminth infections are of particular concern in developing countries and many of these parasitic worms have human hosts. *Ascaris lumbricoides* is one of the most significant human pathogens in sanitary waste, particularly in developing communities. Its importance derives from the fact that it has ova which are extremely persistent in the environment outside the host. Shrestha *et al*,(2010); Gaspard and Schwarzbrod (1995), reported that an important source of exposure for humans to *Ascaris* ova exists in regions were excreta are used as soil conditioners or

fertilizers, so that both the person handling the waste and those consuming unprocessed crops grown in these soils are at risk of infection.

Conclusion

Investigations in this study showed that in this campus, large amount of untreated human waste is discharged into the soil daily leading to the seeding of the soil with pathogenic organisms including geohelminth adult worm, eggs and larvae. Sanitation particularly, proper sewage treatment remains a major factor in poor rural farming systems of developing areas like College of Agriculture Ebonyi State university.

Figure 1: Larvea of *Strongyloides stercoralis*

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