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Parasitic Contamination in Leafy Green Vegetables from Benin Metropolis, Edo State, Nigeria

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ABSTRACT: Vegetables are a rich source of essential vitamins and its consumption is a key part of diets globally. However, consuming inadequately washed vegetables could serve as avenue for passage of intestinal parasites into the body. This study was aimed at investigating the occurrence of parasites in commonly consumed vegetables in Benin City. Vegetable samples were washed in saline and the sediment was examined using $ZnSO_4$ floatation technique for parasites detection. An overall prevalence of 87.0% was recorded. All the Curry leaf samples examined were contaminated. Ewedu, Green, Pumpkin and Scent leaves had 91.7% contamination rate each while Uziza was the least (60.0%). Cysts, ova and larvae of 17 parasites consisting of Acanthocephala, protozoans, and helminthes were recovered. Polyparasitism was observed and Ewedu/Jute leaf (*Corchorus olitorius*) harbored 12 (highest) parasites species while Uziza *(Piper guineense)* had only two species. There was significant difference ($p<0.05$) in prevalence of helminthes parasites between *Ascaris lumbricoides*, Hookworm, *Enterobius vermicularis*, *Strongyloides stercoralis* and unidentified nematode larvae. The thorny headed worm, Acanthocephala is reported for the first time in vegetables. This is of significant public health concern and call for urgent public health intervention on proper vegetable handling and safety practices for farmers and vendors.

Keywords: Leafy Vegetables, Parasites, Contamination, Market, Benin

Introduction

The relevance of fresh vegetables to a healthy human diet cannot be overemphasized as they provide essential vitamins, minerals, antioxidant properties, proteins, carbohydrates and fibers that help prevent chronic diseases and improve overall well-being (Kumar *et al*., 2020; Osafo *et al.,* 2022). According to WHO (2011), about 400 g of vegetables and fruits should be consumed on a daily basis by humans to get adequate health benefits. Globally, the consumption of raw or minimally processed vegetables is a common practice and key part of many traditional dishes. However, this beneficial dietary habit carries a significant public health risk if the vegetables are contaminated with pathogenic organisms.

The cultivation, harvesting, and distribution of vegetables often exposed them to various sources of parasitic contamination. Common risk factors include the use of untreated wastewater or contaminated stream water for irrigation, application of raw or improperly treated animal and human manure as fertilizer, and poor hygiene practices during transportation and marketing (Khan *et al.*, 2021; Abdulkadir *et al.*, 2025). These practices can deposit the infective stages of parasites, including eggs, larvae, and cysts, onto the surfaces of vegetables, particularly leafy greens which have a large surface area (Enogiomwan *et al.*, 2020; Obebe *et al.*, 2020). Consequently, raw vegetables have been identified as a major vehicle for the transmission of intestinal parasites to humans, contributing to the burden of foodborne illnesses (Ajakaye and Obimakinde, 2021).

High rates of parasites contamination have been consistently reported in vegetables from different regions of Nigeria, including Zaria (Abdulkadir *et al.*, 2025), Benue (Nzelu *et al*., 2024), Jos (Nadabo *et al.*, 2022), Ekiti (Mogaji *et al*., 2021), Ibadan (Obebe *et al.*, 2020), and Calabar (Enogiomwan *et al.*, 2020). This problem is not unique to Nigeria as similar studies from Ghana (Amissah-Reynolds *et al*., 2020), Ethiopia (Alemu *et al.*, 2020), Iran (Bahramian *et al.*, 2021), and Nepal (Ansari *et al.*, 2025) have all reported alarming prevalence rates of vegetable contamination. This placed the issue as a widespread challenge in many developing countries where sanitary infrastructure and food safety regulations may be inadequate.

Irrespective of studies from other countries and Nigerian States, the need for continuous monitoring and comprehensive data specifically focusing on the markets within Benin metropolis, Edo State cannot be over emphasized. As a major urban hub with a high consumption rate of vegetables, it is crucial to assess the safety of these food items within this locality. Understanding the specific types and prevalence of parasites contaminating vegetables in Benin City is a critical first step towards assessing the potential health risk to the local population and formulating targeted interventions.

This study was therefore, carried out to determine the parasite species and their prevalence of contamination in vegetables from Benin Metropolis, Edo State, Nigeria.

The findings from the study will provide valuable data for public health authorities, inform consumer education campaigns, and ultimately contribute to strategies aimed at ensuring the safety of vegetables and reducing the incidence of foodborne parasitic infections in the region.

Materials and methods

Study area: Leafy green vegetable samples were purchased from Efehi Street, New Benin Market (6.3508°N, 5.6297°E) (Fig. 1) in Oredo Local Government Area (LGA), Benin City, Edo State, Nigeria. Benin City is the capital and largest urban center of Edo State. The City is located within the rainforest ecological region of southern Nigeria, between latitudes 6°17′-6°26′N and longitudes 5°35′-5°41′E. New Benin Market is one of the largest vegetable trading hubs (Plate 1A-E) in the metropolis, serving as a key distribution point for vegetables supplied from rural farming communities such as Oluku, Udo, Okada, Legbeka and Evbuabogun.. The study site was selected based on its relevance in vegetable trade, and distribution, providing a suitable setting to investigate parasitic contamination of fresh produce.

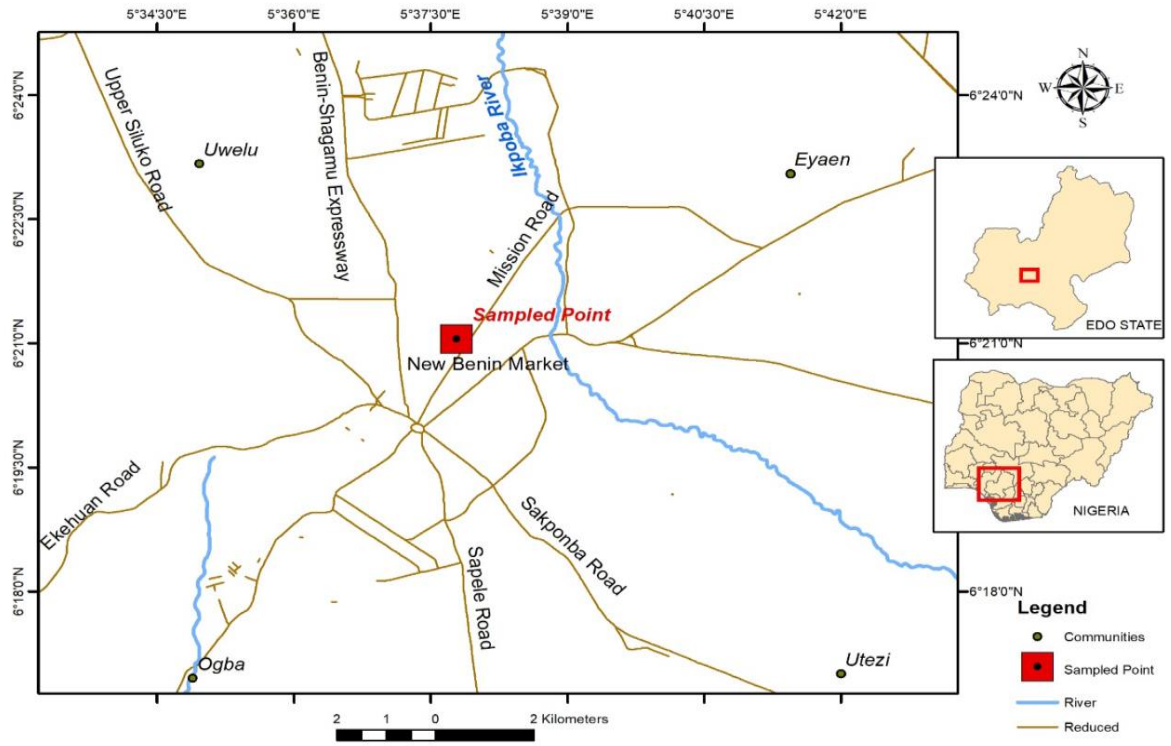

Fig. 1: Maps of Nigeria, Edo State and Benin City, highlighting the study area at New Benin Market, Oredo LGA, Edo State, Nigeria

Sample collection: The vegetable samples were purchased randomly from different vendors at Efehi Street, New Benin Market during the peak of the rainy season (May to October, 2024). The collection occurred during the early market hours (7:00-10:00 a.m.) to ensure freshness and typical market conditions. All samples were collected and stored in individual sterile well labeled polythene bags. The samples were thereafter taken to the Laboratory of Public Health and Veterinary Parasitology for parasitological examination.

Plate 1A-E: Vegetables variously displayed for sale at Efehi Street, New Benin Market, Benin City, Edo State

Examination of samples: Fifty grams (50 g) of each vegetable was weighed to form a sample. This was repeated severally to form the desired sample size. Each sample was washed in 200 ml of 0.72% saline solution. This washing facilitated the detachment of parasite stages, including ova, larvae, cysts, and oocysts, from the surface of the vegetables. After washing, the water was filtered to remove debris and allowed to sediment overnight, enabling the parasite stages to settle to the bottom. The supernatant was discarded and allowed to sediment again; this sedimentation period was crucial for maximizing parasite recovery. Following sedimentation, 15 ml of the sediment was carefully transferred into centrifuge tubes and centrifuged at 1500 rpm for 5 minutes to concentrate the parasite stages. The supernatant was then carefully decanted, and the sediment was gently agitated to redistribute the parasite stages, ensuring uniform distribution.

The sediment was suspended in $ZnSO_4$ flotation solution and re-centrifuged at 1500 rpm for 5 minutes. The $ZnSO_4$ solution was filled to the brim of the tube. A coverslip was placed on top, and a few drops of Lugol's iodine were added to the sample on the slide before microscopic examination. Parasite stages were identified based on their morphological characteristics according to the protocols of Lawrence and Thomas (1991), Arora and Arora (2014) and colour Atlas of Parasitology.

Data analyses: The prevalence of parasite contamination was calculated as percentage of number of vegetable sample infested divided by the number examined. One way Analysis of variance using post hoc test was used to test for significant difference ($p<0.05$) among parasites. Chi square goodness-of-fit test was used to test for a

significant difference (P<0.05) in parasite infestations among the vegetable type. PAST v3.09 (Hammer *et al*., 2001) was used to analyze parasite diversity using the following alpha diversity indices: Shannon diversity (H'), Margalef (d), Equitability or Evenness (J) and Dominance (D).

Results

Prevalence of parasites infestation in vegetable types examined from Efehi Street, New Benin Market, Edo State: A total of 185 vegetable samples made up of 10 varieties were examined from Efehi Street, New Benin market in Oredo LGA, Edo State and 161 were contaminated with at least one parasite species with an overall prevalence of 87.03% parasite contamination. The vegetables examined included Bitter leaf (*Vernonia amygdalina*), Curry leaf (*Ocimum africanum*), Ewedu/Jute (*Corchorus olitorius*), Evbewiewia (*Cercestis mirabilis*), Green leaf (*Amaranthus blitum*), Pumpkin leaf (*Telfairia occidentalis*), Scent leaf (*Ocimum gratissimum*), Sokor leaf (*Celosia argentea*), Utazi leaf (*Gongronema latifolium*), and Uziza leaf (*Piper guineense*). All the Curry leaves examined in this study were infested with parasites, while 23 (95.8%) out of the 24 samples of Bitter leaf examined were infested as shown in Table 1. Ewedu, Green, Pumpkin and Scent leaves recorded 91.7% prevalence of parasite contamination each. Evbewiewia, Utazi and Sokor leaves had prevalence of 83.3, 79.2 and 76.2%, respectively. Uziza leaf had the least prevalence of parasite contamination (60.0%). However, there was no significant difference (p = 0.35) in the prevalence of helminth infestation amongst the vegetables examined.

Table 1: Prevalence of parasite contamination in leafy vegetables from Efehi Street, New Benin Market, Edo State

Vegetable	Number examined	Number infested	Prevalence (%)
Bitter leaf (*Vernonia amygdalina*)	24	23	95.8
Curry leaves (*Ocimum africanum*)	10	10	100.0
Ewedu leaf (*Corchorus olitorius*)	24	22	91.7
Evbewiewia (*Cercestis mirabilis*)	12	10	83.3
Green leaf (*Amaranthus blitum*)	24	22	91.7
Pumpkin leaf (*Telfairia occidentalis*)	24	22	91.7
Scent leaves (*Ocimum gratissimum*)	12	11	91.7
Sokor leaves (*Celosia argentea*)	21	16	76.2
Utazi (*Gongronema latifolium*)	24	19	79.2
Uziza (*Piper guineense*)	10	6	60.0
TOTAL	**185**	**161**	**87.03**

Occurrence and diversity of parasites in vegetables from Efehi Street, New Benin Market, Edo State: Cysts, ova and larvae of 17 parasites belonging to Acanthocephala, Protozoa, Cestoda, Trematoda and Nematoda were recovered from the examined vegetables. The overall species diversity (H') and richness (d) were 1.37 and 1.41, respectively. The nematodes were the most dominant parasites with 7 species and unidentified larvae (47.06%). The parasites included Acanthocephala, Protozoa (*Entamoeba histolytica*, unidentified cyst), Cestoda (*Hymenolepis diminuta*, *Taenia* sp.), Trematoda (*Fasciola* sp., *Heterophyes heterophyes*, *Schistosoma* sp., unidentified trematode) and Nematoda (*Ascaris lumbricoides*, *Enterobius vermicularis* (Pinworm), Hookworm, *Strongyloides stercoralis*, *Toxocara* sp., *Trichuris trichiura* (whipworm), *Trichostrongylus* sp., and unidentified nematode larvae).

Of the vegetable types investigated in this study, Ewedu/jute leaf (*Corchorus olitorius*) was the most infested (70.59%) with species richness (d) and diversity (H') of 2.02 and 2.15, respectively. Green (*Amaranthus blitum*), Pumpkin leaf (*Telfairia occidentalis*) and Utazi (*Gongronema latifolium)* were each infested with 10 (58.82%) different parasites. Bitter leaf (*Vernonia amygdalina*), Curry leaf (*Ocimum africanum*), and Evbewiewia (*Cercestis mirabilis*) were contaminated with 9 (52.94%), 7 (41.18%), and 6 (35.29%), parasite species, respectively. Scent leaf (*Ocimum gratissimum*) and Sokor leaves (*Celosia argentea*) had five (29.41%) parasites infestation each. Uziza (*Piper guineense*) was the least infested with two (11.76%; H' = 0.45, d = 0.24) parasite types. The parasites abundance and the vegetable type infested are presented in Fig. 2 and Table 2.

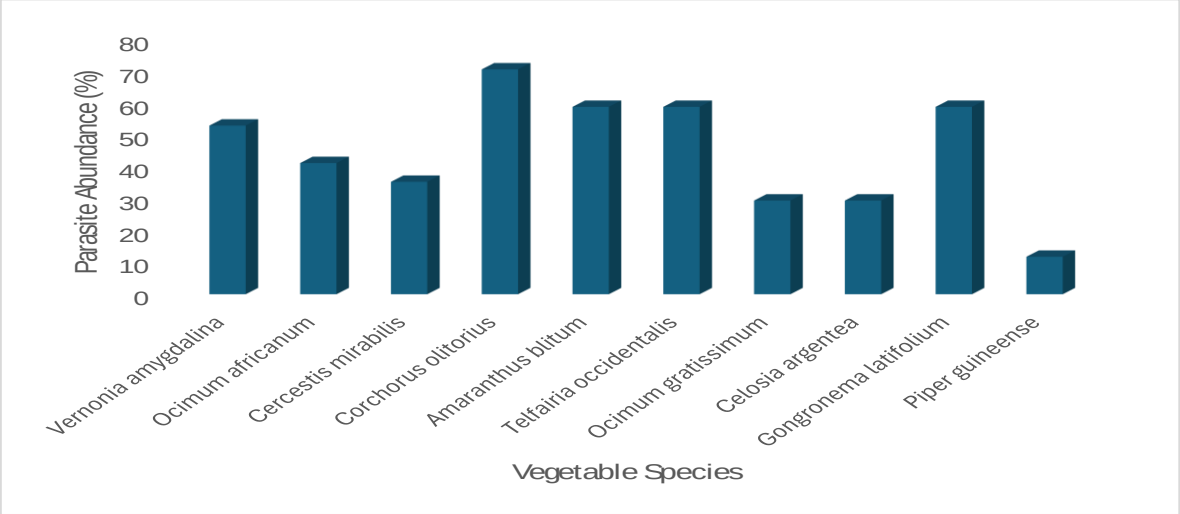

Fig. 2: Parasite species abundance on vegetables from Efehi Street, New Benin Market, Edo State

The nematode, *Ascaris lumbricoides* was recovered from all the vegetable type examined in this study with a prevalence range of 25.0% (in Utazi) to 90.0% (in curry leaf). Similarly, Hookworm infested all vegetable type with the exception of Uziza leaf. The highest prevalence of hookworm was recorded in pumpkin leaf (75.0%); this was followed by bitter leaf (50.0%) and green leaf (45.83%), while the least prevalence was in sokor (4.76%). Acanthocephala (4.17%, Ewedu), *H. diminuta* (10.0%, curry leaf), *H. heterophyes* (4.76%, shokor leaf), *Trichostrongylus* sp. (4.17%, green leaf), and unidentified trematode (10.0%, curry leaf) were recovered from one vegetable type each (Table 2). Parasites species were more evenly distributed in Evbewiewia (0.80) compared to other vegetable types.

In this study, mixed infestations were observed among the parasites. *Ascaris lumbricoides* co-existed with *H. diminuta*, *Taenia* sp., *Fasciola* sp., *E. vermicularis*, hookworm, *H. heterophyes*, *T. trichiura* and with all the unidentified parasites. *Trichuris trichiura* and *Toxocara* sp., hookworm and *Fasciola* sp. also co-existed. Complex polyparasitism was also observed, including one instance of a quintuple infection involving *A. lumbricoides*, hookworm, *S. stercoralis*, *Taenia* sp., and *E. vermicularis*. There was significant difference ($p<0.05$) in prevalence of parasites infestation amongst Acanthocephala, *Ascaris lumbricoides*, *E. vermicularis*, hookworm, *S. stercoralis* and the unidentified nematode larvae.

Multiple linear regression revealed that *S. stercoralis* ($\beta = 2.12$), *E. vermicularis* ($\beta = 2.09$), *Fasciola* sp. ($\beta = 2.03$), and *A. lumbricoides* ($\beta = 1.49$) were the key factors affecting the total presence of parasites in vegetables. This suggests that higher levels of these parasites are linked to significantly greater increases in the overall contamination levels.

Table 2: Parasites diversity and their prevalence of contamination in vegetables from New Benin Market, Edo State, Nigeria

	Vegetables									
Parasite	**Bitter Leaf**	**Curry Leaf**	**Evbewiewia**	**Ewedu**	**Green Leaf**	**Pumpkin Leaf**	**Scent Leaf**	**Sokor Leaf**	**Utazi**	**Uziza**
Acanthocephala	-	-	-	4.17	-	-	-	-	-	-
Protozoa										
Entamoeba histolytica	-	-	-	16.67	8.33	-	-	-	4.17	-
Unidentified cyst	-	8.33	8.33	-	-	4.17	8.33	-	-	-
Cestode										
Hymenolepis diminuta	-	10.0	-	-	-	-	-	-	-	-
Taenia sp.	8.33	10.0	-	4.17	4.17	4.17	-	-	4.17	-
Trematode										
Fasciola sp.	16.67	-	-	8.33	16.66	20.83	-	-	4.17	10.0
Heterophyes heterophyes	-	-	-	-	-	-	-	4.76	-	-
Schistosoma sp.	4.17	-	-	12.5	8.33	8.33	-	-	4.17	-
Unidentified trematode	-	10.0	-	-	-	-	-	-	-	-
Nematode										

Ascaris lumbricoides	66.67	90.0	66.6	58.33	62.5	70.83	83.33	71.72	25.0	50.0
Enterobius vermicularis (Pinworm)	-	50.0	25.0	8.33	4.17	4.17	16.67	9.52	4.17	-
Hookworm	50.0	30.0	8.33	33.33	45.83	75.0	16.67	4.76	29.17	-
Strongyloides stercoralis	45.83	-	-	33.33	25.0	45.83	-	-	41.67	-
Toxocara sp.	12.5	-	-	12.5	-	-	-	-	-	-
Trichuris trichiura (whipworm)	16.67	-	33.3	4.17	4.17	8.33	8.33	-	8.33	-
Trichostrongylus sp.	-	-	-	-	4.17	-	-	-	-	-
Unidentified nematode larvae	4.17	-	41.7	41.7	-	41.7	-	19.1	41.7	-
Taxa_S	9	7	6	12	10	10	5	5	10	2
Dominance_D	0.19	0.27	0.24	0.14	0.21	0.19	0.43	0.47	0.18	0.72
Shannon_H	1.84	1.55	1.57	2.15	1.83	1.86	1.16	1.07	1.89	0.45
Evenness_e^H/S	0.70	0.67	0.80	0.71	0.62	0.64	0.64	0.58	0.66	0.78
Margalef	1.48	1.12	0.96	2.02	1.73	1.60	0.82	0.86	1.77	0.24
Equitability_J	0.84	0.80	0.87	0.86	0.79	0.80	0.72	0.66	0.82	0.65

Discussion

All the leafy green Vegetables investigated in this study from Efehi Street, New Benin Market in Oredo LGA of Edo State, Nigeria, were contaminated with at least one or combination of parasites at varying rate of prevalence, an indication that the environments where these vegetables were cultivated are polluted. Another contributory factor could be the rough surface nature and leaf folds usually associated with these vegetables which possibly enhanced its dirt retention ability (Simon-Oke *et al*., 2014). Nevertheless, the manner in which these vegetables were variously displayed on the ground for sale by vendors (Plate 1A-E) could also be a major means through which they are exposed to parasites contamination (Oranusi *et al.,* 2013). This study was conducted during the peak of the wet season (May to October), which could have also increased the chances of parasites contamination on the leaves (herbaceous) as they are grown close to the soil though Damen *et al.* (2007) posited that more parasites stages are detected in fruits and vegetables during the summer months than in the winter where they (parasites) are easily washed away by the rains.

The overall prevalence (87.03%) of parasite contamination recorded in the leafy vegetable investigated in this study is high when compared to the studies of Fagbenro *et al.* (2016), Okpala *et al.* (2016), Ikpeze *et al.* (2017), and Imalele *et al.* (2020) where prevalence of 73.5, 42.4, 25.8 and 15.7%, respectively were recovered in vegetables from Ogun (Abeokuta), Edo (Ekpoma), Anambra (Nnewi), and Cross River (Calabar) States also respectively. Lower prevalence of 53.4% and 65.0% were reported from Ekiti State by Mogaji *et al.* (2021) and Eya *et al.* (2024), respectively; while Ola-Fadunsin *et al.* (2022) and Nzelu *et al.* (2024) reported a prevalence of 50.14% and 68.5%, respectively from Kwara and Benue States. The overall prevalence recorded in our study is also higher than the account of Eraky *et al.* (2014) and Kudah *et al.* (2018) in Egypt (29.6%) and Ghana (57.5%), respectively. This discrepancy is most likely due to variations in the vegetable types examined; sample size, ecological location, period of investigation and method used in processing the vegetables for parasites recovery.

Cysts, ova and larvae of 17 parasites including 7 fully identified species (*Entamoeba histolytica*, *Hymenolepis diminuta*, *Heterophyes heterophyes*, *Ascaris lumbricoides*, *Enterobius vermicularis*, *Strongyloides stercoralis*, and *Trichuris trichiura*); five that were identified to the generic level (*Toxocara* sp., *Taenia* sp., *Fasciola* sp., *Schistosoma* sp., and *Trichostrongylus* sp.); two to the group level (Acanthocephala, Hookworm); and three unidentified (Protozoa cyst, trematode ova and nematode larvae) were encountered in this study (Table 2). However, lower parasite species number of 8, 4, 9 and 7 has been reported by Fagbenro *et al*. (2016), Ikpeze and Chima (2017), Mogaji *et al*. (2021) and Eya *et al.* (2024). The high contamination rate, coupled with the high diversity of parasites recovered could be a reflection of the level of contamination in the environment were these vegetables were cultivated, transported and stored (Nzelu *et al*., 2024). This level of contamination indicates a substantial public health risk associated with the consumption of raw or inadequately washed vegetables, a concern that resonates both locally and globally.

In this study, the nematodes predominated with 7 species and unidentified larvae (47.06%). Several factors have been attributed to the buildup of nematode parasites in the environment especially in farms among which are agricultural practices like continuous monoculture and cultivation of the same farmland (Orluoma *et al*., 2023; Omokanye and Onu, 2024). In the words of Mendoza-de Gives (2022), 'Nematodes are considered as the most

abundant metazoan on earth'. The predominance of nematode has also been observed by Mogaji *et al.* (2021) from Ekiti State where 5 species (55.56%) out of 9 species were reported. All the parasites (*Ascaris* sp., *Trichuris* sp., Hookworm, *Enterobius* sp., *Strongyloides* sp., *Fasciola* sp., *Taenia* sp., and protozoan cyst) reported by Mogaji *et al*. (2021) with the exception of *Paragonimus* sp. were encountered in this study.

Among the nematodes, *A. lumbricoides* was the most dominant species being recovered from all the 10 vegetable type examined though with varying prevalence of infestation (25.0% - 90.0%); followed by hookworm, *E. vermicularis*, *T. trichiura*, unidentified larvae and *S. stercoralis* which were recovered from 9, 8, 7, 6 and 5 vegetable types, respectively (Table 2). In contrast, Okpala *et al*. (2016) reported *Strongyloides stercoralis* as the dominant nematode (32.1%) in a similar study conducted at Ekpoma while Mogaji *et al*. (2021) noted hookworm as the dominant parasite. The dominance of *A. lumbricoides* could be attributed to the versatile nature of the parasite. *Ascaris* egg has a tough highly resistant outer shell which makes it survive the external environmental conditions such as temperature fluctuations and desiccation thereby enhancing its viability in the soil for years (Otubanjo, 2013). Asaolu *et al.* (2002) and Sam-Wobo and Mafiana (2006) have similarly reported the dominance of *A. lumbricoides* in addition to hookworm as soil transmitted helminthes in their studies from Osun and Ogun States, respectively.

There were variations in contamination rates among vegetable types investigated in this study. This was probably influenced by different factors like leaf structure, farming methods, and water sources used for irrigation (Mogaji *et al*., 2021). Leafy vegetables with broad surfaces, such as *Amaranthus blitum* (Green leaves) tend to retain more soil and waterborne contaminants, which explains their higher contamination rates and parasite number (Table 1 and 2). *Amaranthus blitum* has broad, ovate leaves with smooth edges and a soft texture. Its stems are tender and slightly succulent, allowing for rapid growth. Due to its broad leaf surface and the ability to trap moisture, *A. blitum* provides an ideal environment for parasite attachment and proliferation. The high moisture retention increases the risk of contamination, especially when irrigated with polluted water or exposed to soil-borne parasites.

Among the vegetables examined in this study, Ewedu (*Corchorus olitorius*) leaf was the most infested with 12 (70.59%) species of parasite (Fig. 2, Table 2). This observation is in conformity with the reports of Fagbenro *et al*. (2016) and Eya *et al*. (2024) where more parasites incidence were also reported in Ewedu leaf. *Corchorus olitorius*, commonly known as jute mallow or Ewedu in Yoruba, is a member of the Malvaceae family. It is an annual herbaceous plant with slender, erect stems and lanceolate leaves with serrated margins. The mucilaginous nature of *C. olitorius* makes it highly susceptible to trapping dust, soil particles, and parasite eggs/larvae, especially in unhygienic environments. Since Ewedu leaves are commonly consumed as a slimy smoothie and soup, inadequate washing before consumption can lead to parasite ingestion, thereby increasing the risk of contamination. The thorny headed worm, acanthocephalan was recovered from only Ewedu leaves in this study with a prevalence of 4.17% (Table 2). This is the first report of this parasite in vegetable in Nigeria from available literatures.

Vernonia amygdalina (Bitter leaf) and *G. latifolium* (Utazi) were respectively, contaminated with 9 and 10 intestinal protozoan and helminthes parasites. These are medicinal plants with bitter taste often consumed fresh or as an infusion, increasing the need for proper hygiene before consumption.

Uziza (*Piper guineense*) had the least number of parasites [2 (11.76%)] species contamination as also observed by Fagbenro *et al.* (2016), Nzelu *et al*. (2024) and Eya *et al*. (2024). *Piper guineense* leaves are notable for its high potent secondary metabolites (Okigbo and Igwe, 2007; Ogunniran, 2009) such as reducing sugar, saponins, alkaloids and tannins (Konning *et al*., 2004) which enhanced its antimicrobial effectiveness against fungi and bacterial pathogens. These properties could have also played significant role in the low parasite abundance (Fig. 2) and prevalence (Table 2) observed in this spicy vegetable. Additionally, Nwinyi *et al*. (2008) noted the usefulness of *P. guineense* in the control of the virulence *Aspergillus* and *Candida* fungi.

The presence of multiple parasites on the vegetable indicates a significant level of contamination, which may be attributed to exposure of polluted soil, water, or unhygienic handling practices among farmers and sellers. Co-infections of these parasites on the same host can lead to grievance health consequences especially in vulnerable and immune compromised individuals. Therefore, enhancing the level of hygiene in vegetable farming and processing is vital in minimizing the likelihood of parasite infections among sellers and consumers.

Conclusion

This study showed that all the vegetables types examined were contaminated with parasites. The detection of multiple parasites, including acanthocephalan, protozoa and helminths, calls for urgent intervention and improved sanitary practices across the entire vegetable supply chain, from farm to market. Acanthocephala is reported in leafy vegetable for the first time in Nigeria. Most of these vegetables are spicy and have medicinal

values; they are usually consumed raw or cooked with minimum heat exposure to maintain their potency. Therefore, they should be thoroughly washed with clean water to which salt or vinegar is added before consumption to enhance food safety. Farmers and traders should be adequately educated on the health implication of using contaminated water and manures. Furthermore, routine monitoring of vegetables for parasitic contamination is of utmost importance to ensure food safety.

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