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Survey of Arthropod Associated with Refuse Disposal Sites in Ijebu-Ode, Ogun State

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Abstract: The aim of the study is to investigate the abundance of arthropod pests and its diversity at different refuse disposal sites in Ijebu Ode. A survey of some refuse dumps for the presence of arthropod associated with them was carried out in Ijebu-ode Local government Area, of Ogun state. The refuse dumps were randomly selected based on their location within the town, these included Ikangba housing Estate, Wasimi, Olisa, Mobalufon and Sabo areas. Different methods were used for the collection of these Arthropods: such as Handpicking, water traps, sweep net and sticky traps. Arthropods collected included members of the family Muscidae, Culicidae, Blattidae, Scolopendridae, Diplopodae, Gryllidae and Sparassidae. *Musca domestica* (Houseflies) were the most abundant (31.31%), while the least were *Otiorrhynchus sulcatus* (Coleoptera) (1.01%). *Aedes egypti* and *Culex restuans* (Diptera) accounted for 12.12%, *Blatta lateralis* (Blattodea) (10.61%) and *Chromatopelma yaneopubescens* (Araneae) (13.64%).The relative occurrence of these arthropods suggested the possibility of some vector borne diseases in Ijebu-Ode environs, hence the need for proper disposal of refuse to avert an epidemic status.

Keywords: Arthropods, health, municipality, refuse, vector

INTRODUCTION

Every household produces a certain amount of waste or refuse daily. If this refuse is thrown outside the house, it encourages the breeding of animals' vectors like houseflies, mosquitoes, cockroaches and rats. These vectors spread many diseases, thereby affecting the health of the community. Refuse therefore must be collected, stored in covered bins by each household and disposed off properly at regular interval (Sarojini, 2005)

In many rural areas, each household is responsible for disposing their refuse by burning or composting. Dry refuse such as paper and husks of food are usually burnt. Refuse which cannot be burnt like; glass and metals are usually buried in an area of waste land. In towns and cities according to Sarojini (2005), refuse disposal is the responsibility of the public health authorities, which comes under the Ministry of Health.

The quantity of solid wastes generated in urban cities on daily basis is quite enormous. In Oyo state Nigeria, it was estimated that the quantity of solid waste generated daily in 2007 was 50.90 ton (Afon and Okewole, 2007). In Nigeria as in some other developing countries the urban landscape are littered with garbage, plastics, bottles, disposable cups, discarded tyres and even human and livestock faeces. These wastes have aesthetically and unpleasant odour especially when their organic compositions are acted upon by putrefying bacteria. These refuse dumps thus constitute vector, vermin and other nuisance organisms capable of transmitting or causing diseases such as typhoid, diarrhea and cholera in humans and animals. (Siboe *et al*., 1996). *Musca domestica* breed and frequently visit human homes where they crawl over food and household utensils depositing the pathogens as they do. Their survival and capacity to transmit diseases are directly linked with putrefying solid wastes. Increased incidence of cancer and asthma has been reported in house built on a former dump area (Pukkala and Ponka, 2001). The used tyres and water-holding containers in the refuse dumps form breeding grounds for different species of mosquitoes especially during the raining season and these mosquitoes cause great suffering and economic loss because of their blood sucking habits and disease transmission. The spread of *Aedes albopictus* in the United States has been reported to be facilitated by waste tyres (Novak, 1995).

According to Leuton and Omotosho (2004), cities in Nigeria, being among the fast growing cities in the world are faced with the problem of solid waste generation. The implication is serious when a country is growing rapidly and the wastes are not efficiently managed. Ogbonna *et al*. (2002) has observed that little or no attention is given to some traditional sub urban settlements for provision of waste collection and disposal services. In the study of the implication of un-disposed refuse dumps in Enugu, Urban South-eastern Nigeria, Ozumba and

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Nwosu (2003) estimated the composition of the refuse dumps as follows: domestic and faecal organic matter material -20%, metal and glass materials -6 and 3% respectively, chemical and others -1%.

Poor sanitation and improper waste disposal under wartime conditions greatly increase the disease vector potential of such common pests as filth flies and rodents. Open dump of solid waste is a common practice in Nigeria while some employ the service of streams to transport their solid wastes out of sight; some directly dump their solid wastes by the roadsides. In some part of Nigeria, refuse is generally buried, though some heedless burning is sometimes observed (Igoni *et al*., 2007). Several Nigerian have considered it a cheap way of disposing off their solid wastes by setting the mixed wastes on fire in a little corner in their backyard or in a very open place. Even, mountains of mixed solid wastes in so-called designated places are set on fire, causing serious and dangerous environmental pollution. Folorunso and Awosika (2001) related flooding in Lagos to clogging of drainage channels by dumped solid wastes. Due to contact with smokes from dumpsites, cases of several diseases have been recorded (Oyelola *et al*., 2009).

Consequently, the composition of these refuse dumps has caused series of diseases evolving and affecting the lives and health of humans residing within the locality of the deposited wastes. Therefore it has become necessarily to look into this menace affecting the health of the nation's populace, in other to reduce disease transmission through various arthropod vectors and to maintain the healthy living of the people. Therefore the aim of this work is to determine the prevalence of arthropods associated with selected refuse dump sites.

MATERIALS AND METHODS

The study was conducted in Ijebu-Ode town of Ogun state between December 2009 and May 2010. Ijebu-Ode is situated some 60 km north-west of Lagos. The city has an estimated population of 163,000 in 1999. Its continued physical expansion has also meant that it has virtually merged with neighboring settlements such as Mobalufon, Erinlu, Molipa, Oke Owa, Iwesi, Igbeba and Latogun to give it a population in excess of 200,000. Ijebu-Ode is a relatively old city dating, from 900 AD.

Field investigations were carried out in five selected sites within Ijebu-Ode Local Government Area, these are:

- Ikangba estate
- Wasimi street
- Olisa street
- Mobalufon
- Sabo road

Several refuse dumps were scattered around the town with differences in their age, size and location. Some large deposits of refuse dumps have been accumulated over years, while others are smaller but more recent. From all these refuse dumps, five strategic sites were selected at random for the purpose of this field observation with respect to their volumes, location and composition.

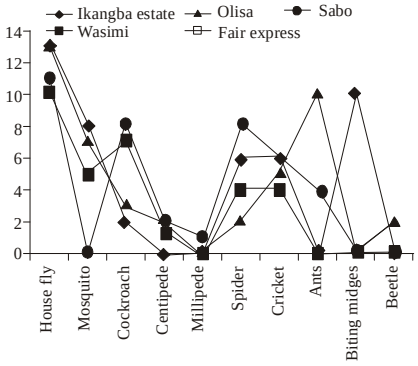

Fig. 1: Graph of the distribution of the arthropods collected in the various locations studied in ijebu-ode local government area

Arthropods were collected through the use of sweep net, water trap, Handpicking and sticky traps.

Arthropods were preserved using 70% ethanol after collection, while mosquitoes were kept in a Petri dish on a filter paper placed on moist cotton wool. They were later taken to the Department of Agriculture and Environmental Biology University of Ibadan for identification.

Arthropods were collected in the morning between 7 and 10 am and this was done on weekly basis.

Arthropods collected from the various locations were recorded in order to study the relative occurrence of the arthropod species collected in each location.

RESULTS

Most arthropod belonging to the Order Diptera (*Musca domestica, Aedes egypti, Culex restuans*), Dictyoptera (*Blatta lateralis*), Myriapoda (*Tachypodolulus niger, Scolopendra subspinipes*), Orthoptera (*Scapsipedus marginatus, Gryllus bimaculatus*) and Araneae (*Chromatopelma yaneopubescens, Heteropoda venatoria*) were caught.

From the five refuse dumps selected, Fig. 1 shows the frequency distribution of arthropods collected in the various locations studied. *Musca domestica* (Houseflies), *Chromatopelma yaneopubescens*, (Spiders), *Gryllus bimaculatus* and *Scapsipedus marginatus* (Crickets), *Aedes egypti* and *Culex restuans* (Mosquitoes) were the most abundant as they were found in all the locations studied. The most abundant species was *Musca domestica* (31.31%) while the least abundant was the beetle 1.01%. The abundance of *Musca domestica, Aedes egypti* and *Culex restuans* in the areas studied may lead to the spread

Table 1: One way analysis of variance

Source	DF	SS	MS	F	Prob.
X3 residual	4	9.4	2.35	0.1	0.972
	45	841.1	18.691		
Total	49	850.5			

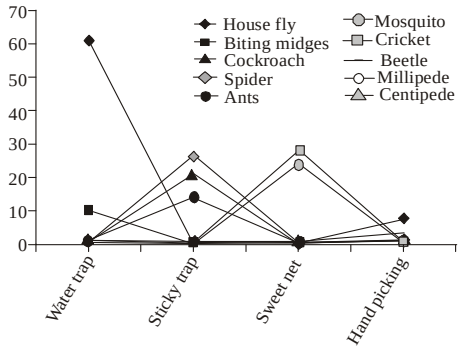

Fig. 2: Abundance of different arthropods collected using different traps

of cholera and malaria if simple rules of hygiene are not strictly adhered. The absence of millipedes and centipedes in Ikangba Estate could be due to the environmental factors in that area.

The statistical analysis carried out on the pest occurrence at and the various locations studied showed that there is no significant difference between the pest population and each area studied (Table 1).

Figure 2 shows the relative efficacy of each method of collection of arthropods with the water trap accounting for 36.36% while the least was collected by handpicking accounting for 6.06%
of the total catch.

DISCUSSION

Many indiscriminate refuse disposals at varying decomposing stages were observed within Ijebu-Ode municipality. This is perhaps an indication of poor sanitary condition in the town. Obionu (2004) noted that the greatest challenge to the environmental health in Anambra State and indeed Nigeria are those of municipal solid waste and human excreta. He further observed that bucket latrines and bush defecation are still in vogue in urban slums and rural communities while solid wastes block urban roads and provide breeding foci for disease carrying vectors and rodents.

Agu and Mogbo (2004) observed that environmental problems in Anambra State included gross inadequacy of basic sanitation, lack of portable water supply, water and land pollution occasioned by industrialization and urbanization. The indiscriminate accumulations of refuse dumps in cities are detrimental both to the inhabitants and the disposal industry operators (Collombi, 1991).

Similarly the incessant dumping of refuse by Ijebu-ode citizens in different parts of the town is highly unpleasant as this to conclusion has been a major factor in the prevalence of malaria in ijebu ode as reported by Fasunwon *et al*. (2006). Arthropod belonging to the families *Muscidae* and Culicidae (Diptera), Blattidae (Dictyoptera), Scolopendridae (Scolopendromorpha), Diplopodae (Diplopoda), Gryllidae (Orthoptera) and Sparassidae (Araneae) were found in all the study areas. This was in contrast to vertebrate organisms (Rodents and Snakes) which were found in two refuse dumps in Awka Anambra State (Onyido *et al*., 2009). The predominance of houseflies, mosquitoes and cockroaches in Ijebu-ode points to the possible mechanical transmission of diseases. The findings of the present study is consistent with the study in which the relative importance of mosquitoes breeding in the water holding containers found in refuse dumps is indicative that malaria and other water-borne disease will be prevalent in the area (Onyido *et al*., 2006). The result of this survey therefore underlines the hazards associated with indiscriminate dumping of refuse. Siboe *et al*. (1996) reported the potential human danger resulting from moulds growing on crude garbage dumps. Other researches also highlighted the detrimental effects of arbitrary refuse dumping in the cities (Pukkala and Ponka, 2001).

The predominance of houseflies and cockroaches revealed possible mechanical transmission of diseases. The relative abundance of mosquitoes breeding in the water holding containers found in the refuse dump is indicative that malaria and other mosquito-borne diseases will be prevalent in the area.

The composition of the refuse dumps were mainly domestic wastes including vegetable matter, paper wrappings, tin cans, used tyres, cartons, plastic and polythene materials.. The consumption of leafy vegetables and crops produced in contaminated soils may pose a health risk to those that reside around the refuse dumps areas (Pach, 1996). More so, the sites could also attract rodents and snakes which are delicate to the health of both children and adults. This study therefore calls for government attention to the public health dangers posed by improper refuse dumps.

CONCLUSION

The uncontrolled manner in which refuse is disposed of at different disposal sites creates serious health problems to human, animals and the environment at large. This indiscriminate waste disposal results into economic and other welfare loses. The sanitary state of an area is largely influenced by proper handling of waste practices of the residents and the measures in place for safe waste evacuation and disposal.

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