



USE OF MOSQUITO NETS IN HOUSE FLOWERS PROTECTION IN PORTO-NOVO DISTRICT IN SOUTH-EASTERN REPUBLIC OF BENIN, WEST AFRICA

Environment Science

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ABSTRACT

Introduction: Crop's protection is necessary at increasing crop yields. Objectives: The current study was aimed to investigate on the use of mosquito nets in house flowers protection in Porto-Novo district in south-eastern Republic of Benin, West Africa. **Methodology:** The location of Danto in Porto-Novo district was surveyed from September to November 2024 during the small rainy season to collect information about the number of houses where flowers were protected by mosquito nets, the kind of palisade of protection, the kind and number of mosquito nets used in house flowers protection. **Results:** The results showed that the number of houses where flowers in front were protected by mosquito nets were twelve (12). These flowers in front of houses were protected by palisade made essentially with iron and cord. Two kinds of mosquito nets were used in house flowers protection. There were: Permanet 2.0 and Olyset net. The number of Permanet 2.0 used in house flowers protection were higher than the number of Olyset net used for this purpose. **Conclusion:** Even if the mosquito nets are not impregnated with insecticide, if they are intact or without hole, they are still a physical barrier against mosquito bites. The use of mosquito nets in house flowers protection is a bad practice.

KEYWORDS

Permanet 2.0, Olyset Net, House Flowers Protection, Pests, Benin

INTRODUCTION

The control of the pests is a challenge for producers who generally use chemical control. The use of chemical products in pest control is not without drawbacks for the health of applicators, consumers (presence of residues in vegetables) and biodiversity^[1,2,3,4,5,6,7,8]. The search for alternative strategies to chemical control has become a priority for the scientific community^[9,10,11]. Physical control, such as the use of anti-insect nets, is one of the ecological alternatives.

Using netting effectively in agriculture mostly depends on how well it is installed. For instance, even though the fabric was intended to avoid this kind of damage in the first place, if there are gaps or holes in it, pests could still get through and injure the crop. When installing the nets, appropriate tensioning methods and staking procedures must be used to ensure that they create an effective barrier against potential threats while always allowing enough airflow during their lifespan of use^[12].

The netting technology is a pest control method that is safe for gardening and is progressively being adopted as a viable option for small-scale farmers. It promotes acts like keeping the garden clean and weeded, use of mulches to promote water retention in the soil, and the use of organically made pesticides when absolutely necessary. This is to protect the crops from harmful vectors as opposed to chemical use. As the determination towards organic farming grows, more local farmers are warming up to the idea of using the farm nets also known as Eco-friendly nets.

Although insect-proof nets are effective tools for sustainable agricultural production, net covering unintentionally alters the microclimate inside the screenhouse, mainly by decreasing the air speed and changing radiation regime, which markedly affects crop physiology, growth, and yield^[13]. Insect-proof nets decrease the air speed inside the screenhouse because of the increase in airflow resistance^[14], which could reduce the supply of CO₂ for photosynthesis^[15] and increase the temperature and humidity^[16]. Moreover, insect-proof nets decreased the level of solar radiation and modified the light quality parameters, which greatly affected dry matter production and yield^[17,18,19].

Assogba-Komlan *et al*^[20] had recently assessed the effects of the use of insect nets in vegetable production in four departments of southern Benin (Mono, Couffo, Ouémé and Plateau) using an interview guide and a structured questionnaire.

Very few researches were published on the use of mosquito nets in house flowers protection in Porto-Novo district. Therefore, there is a need to carry out new researches for this purpose.

The goal of this study was to investigate how people used mosquito nets to protect their house flowers in Porto-Novo district in south-eastern Republic of Benin.

Objectives

To investigate on the use of mosquito nets in house flowers protection in Porto-Novo district in south-eastern Republic of Benin, West Africa.

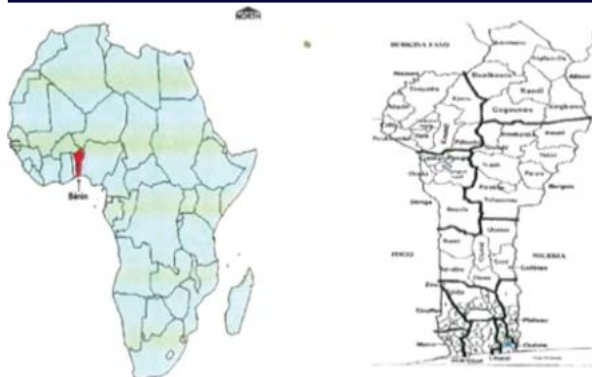
MATERIAL AND METHODS

Study area

The study area is located in Republic of Benin (West Africa) and includes the department of Ouémé. Ouémé department is located in the south-eastern Republic of Benin and the study was carried out in Porto-Novo district more precisely in the location of Danto (Figure 1). The southern border of this district is Sèmè-kpodji district. The northern borders are Akpro-Missérété and Avrankou districts. The eastern border is Adjarra district and the western border is Agugué district. Porto-Novo district covered 52 km².

The choice of the study sites took into account the economic activities of populations, their usual protection practices against mosquito bites and peasant practices to control farming pests. Porto-Novo has a climate with four seasons, two rainy seasons (March-July and September-November) and two dry seasons (December-March and August-September). The temperature ranged from 23,1 to 32°C with the annual mean rainfall, which is between 1100 and 1200 mm.

Figure 1: Map of Republic of Benin showing Porto-Novo District



Data collection

The study was carried out from September to November 2024 during the small rainy season in the location of Danto in Porto-Novo district. This location was surveyed to collect information about the number of houses where flowers were protected by mosquito nets, the kind of palisade of protection and the kind and number of mosquito nets used in house flowers protection.

Data analysis

Analysis using Fisher's exact test and test of proportion was performed on the data sets gathered from the location surveyed to appreciate how farmers used mosquito nets to protect their house flowers. The significance level was set at 5%.

RESULTS

The analysis of table 1 showed that the number of houses where flowers in front were protected by mosquito nets in Danto location in Porto-Novo district were twelve (12). These flowers in front of houses were protected by palisade made essentially with iron and cord. Two kinds of mosquito nets were used in house flowers protection. There were: Permanet 2.0 and Olyset net. The number of Permanet 2.0 used in house flowers protection were higher than the number of Olyset net used for this purpose.

Table 1: Recording of the number of houses where flowers in front were protected by mosquito nets, kind of palisade of protection, and kind and number of mosquito nets used in house flowers protection

Location	Number of houses where flowers were protected by mosquito nets	Kind of palisade of protection	Kind of mosquito nets used in house flowers protection	Number of mosquito nets used in house flowers protection
Danto	12	Essentially made of iron and cord	Permanet 2.0 Olyset net	14 05

The following figures came from photos taken on the field during our survey:



Figure 1: A house where flowers in front were protected by both Permanent 2.0 and Olyset in Danto location



Figure 2: A house where flowers in front were protected only by Permanent 2.0 in Danto location



Figure 3: A house where flowers in front were protected only by Olyset net in Danto location

DISCUSSION

In the current study, the number of houses where flowers in front were protected by mosquito nets in Danto location in Porto-Novo district was twelve. The use of mosquito nets in flowers protection is scarce phenomenon in Benin country until the current study was conducted out to discover it in Porto-Novo district in south-eastern Republic of Benin.

Regarding the agricultural netting benefits, according to Howard[12], farmers can safeguard their crops from pests and damage by using netting in agriculture, which offers a number of benefits. The main advantages of netting are examined in this article. First, utilising nets spares farmers from adopting dangerous techniques like chemical insecticides to keep birds out of their farms. Nets offer a reliable physical barrier that prevents birds from accessing priceless crops, reducing agricultural losses from bird predation and averting potential health hazards from hazardous chemicals. Crop netting also offers some protection against hailstorms and can stop wind-blown sand and dust particles from harming plants. Using agricultural netting also has the benefit of increasing yields by safeguarding sensitive young fruits and vegetables during the growth process. The use of nets helps prevent animals or people from kicking these delicate things off branches or vines before they have had a chance to fully develop. Also, when utilised properly, crop nets can lower evaporation rates so that more moisture is retained in the soil structure. That results in higher levels of water retention, which in turn improves plant growth conditions and increases yields in general. Last but not least, employing nets allows growers to save money by removing the need for physical work during harvest, such as weeding or handpicking fruit and vegetables. Moreover, expenses per hectare can be greatly decreased over time when compared to other types of pest management systems because the majority of netting types are strong enough for repeated usage over several seasons. Thus, agricultural netting offers a wide range of useful options for farmers seeking to maximise efficiency while defending their crops from outside dangers. The flowers in front of houses were often attacked by pests, herbivore animals (beef, sheep...). These flowers in front of houses were protected by palisade made essentially with iron and cord. The way the people put mosquito nets is a barrier against herbivore animals. This way, cannot protect flowers from the attack of pests.

Two kinds of mosquito nets were used in house flowers protection. There were: Permanet 2.0 and Olyset net. The number of Permanet 2.0 used in house flowers protection were higher than the number of Olyset net used for this purpose because the meshes of Permanet 2.0 were smaller than those of Olyset net. These mosquito nets were often received from the different free distribution of Long-Lasting Insecticidal Nets (LLINs) by the National Malaria Control Program (NMCP). Some of these mosquito nets used in flowers protection may be bought by farmers or received as donation by them. Permanet 2.0 and Olyset are impregnated with pyrethroids. According to Zaim *et al* [21], pyrethroids have unique modes of action such as fast knockdown and excito-repellent effects. Instead of using the mosquito nets which are regularly distributed free by the NMCP and which are Long-Lasting Insecticidal Nets (LLINs) against mosquito bites, peasants prefer using them to protect the flowers in front of their houses.

Regarding the available netting types, the insect screening is the first kind of netting frequently used in agricultural operations. Bird netting is another typical type of netting used in agriculture. Last but not least, shade mesh provides both thermal and physical protection from high temperatures and direct sunshine. These nets were different from mosquito nets which were recommended in malaria vector control.

CONCLUSION

Even if the mosquito nets are not impregnated with insecticide, if they

are intact or without hole, they are still a physical barrier against mosquito bites. The use of mosquito nets in house flowers protection is a bad practice.

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Conflict of interest

We declare that there is no conflict of interest regarding the publication of this article.

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