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JOURNAL of AGRICULTURAL
and NATURAL SCIENCES

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Life style of people and surveillance of management related to cockroaches in Southern Punjab, Pakistan

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Received: 03.01.2014 Received in revised form: 23.02.2014 Accepted: 25.02.2014

Abstract

Cockroaches are the major household pests which prefer humid areas for habitation i.e. bathrooms, kitchens, sewerage systems etc., where warmth, moisture and food are satisfactory. Cockroaches are responsible for transmitting microorganisms like pathogenic bacteria, virus and fungi. Some examples of common bacterial diseases of human beings transmitted by cockroaches are *Pasteurella pestis* and bubonic plague; *Shigella alkalescens* and dysentery; *Staphylococcus aureus* and boils and abscesses; *Shigella paradysenteriae* and diarrhea in children. A questionnaire was designed to collect the information from the people of different occupations viz., students, property-owners, house owners/housewives and farmers. In interviews, questions related to basic information as well as control measures regarding the cockroaches were asked. To collect information related to cockroach different cities of Punjab, Pakistan were visited. Data indicated that 80% people were not aware of type of diseases transmitted by cockroaches. Information related for control of cockroaches revealed that according to the opinion of 79% interviewee cleaning or sanitation gave better control. For the best source of delivering information related to cockroaches, 52% people said television was the best source. In the light of the survey, it was concluded that there was an urgent need of provision of proper guidance regarding cockroaches and diseases associated with them to the community for better management of cockroaches.

Keywords: Cockroaches, control measures, community and surveillance

Introduction

Human habitation is associated with 30 of the 4000 species of cockroach in the world; but mostly three species are considered pests in Pakistan. They are the American cockroach (*Periplaneta americana* L.), German cockroach (*Blattella germanica* L.), Oriental cockroach (*Blatta orientalis* L.) (Hojat, 1996). Cockroaches are tropical in origin so they live in parts of houses and other buildings i.e. bathrooms, kitchens, sewerage systems etc., where warmth, moisture, and food are adequate (Cloarec et al., 1992; Rivault, 1993; WHO, 1997). Furthermore, their feeding mechanisms and filthy breeding habits make them the ideal agents for harboring and transmitting pathogenic bacteria (Brenner, 1995) as well as viruses, fungi, protozoa and helminthes. Reports have proved that cockroaches are the carrier of 40 different species of bacteria which are pathogenic to vertebrates (Roth and Willis 1957a, 1960; Burgess et al. 1973a, 1973b, 1974; Artyukhina and Evokimov 1973; Ulewicz and Zawistowski 1973; Klowden and Greenberg 1976; Ash and Greenberg, 1980; Cornwell and Mendes, 1981). Some common examples of human diseases known to be transmitted by cockroaches are bubonic plague, dysentery, boils and abscesses, diarrhea in children; enteric fevers and gastroenteritis, infections of the urinary tract, infections of the urogenital tract and intestine; leprosy; puss formation, food poisoning and typhoid fever (Cornwell, 1968; Cornwell and Mendes, 1981).

Due to wide spread use of insecticides i.e. pyrethroids (permethrin, tetramethrin, cypemethrin), carbamates (propoxur) and organophosphates (dichlorovos, chlorpyrifos) resistance has already become common among cockroaches (Atkinson et al., 1991; Hemingway et

al., 1993). Thus due to increasing costs of application, pest resurgence, pest resistance and lethal effects on non-target organisms (Paranagama et al., 2003), chemical control is usually not recommended in houses. Thus for better development of better control measures, this study was conducted as the focus of our study was to evaluate the diseases associated with the cockroaches to evaluate the most effective control method of cockroaches in surveyed areas. This survey provided information on the cockroach abundance, habitats and the prevalence of cockroaches found in different areas of Pakistan. The information obtained would, therefore, be valuable for cockroach control and allergy management. The surveys will provide the basic information on the prevalence of cockroaches in houses and methods commonly adapted for their management. This information will be used in developing control measures and managing allergic conditions.

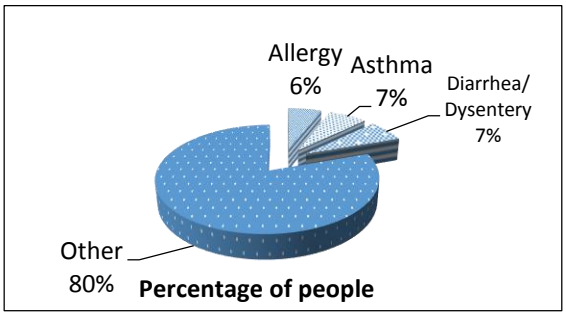

Figure 1. People perception about disease spread due to cockroach in Southern Punjab, Pakistan

Materials and Methods

Feedback form

Performa was designed in Eco-toxicology Laboratory in Department of Entomology, Faculty of Agriculture Science & Technology, Bahauddin Zakariya University, Multan according to the guiding principles recommended by Frary (Frary, 1998)

Areas of Survey

The present data was collected from five hundred persons of different areas of Province of Punjab, Pakistan from the end of January to April 2013 including cities Multan, Rajanpur, Muzafargarh, Kot-Addu and Faisalabad.

Data Assemblage

The aim of the study was to collect the information about:

- Fraction of persons able to identify the real threats come due to the cockroaches in homes
- Community awareness about the economic importance of cockroaches
- Control measures adopted by interviewers for the management of cockroaches

Statistical analysis

Data of the surveyed information was analyzed by using SPSS software. Graph were also drawn regarding the personal knowledge of educated persons of different disciplines about malaria and its vector and how they manage both disease and the vector on SPSS system.

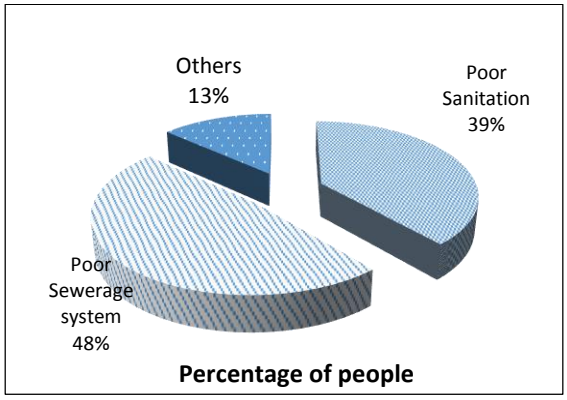

Figure 2. People of Southern Punjab give reason about abundance of cockroaches in their houses

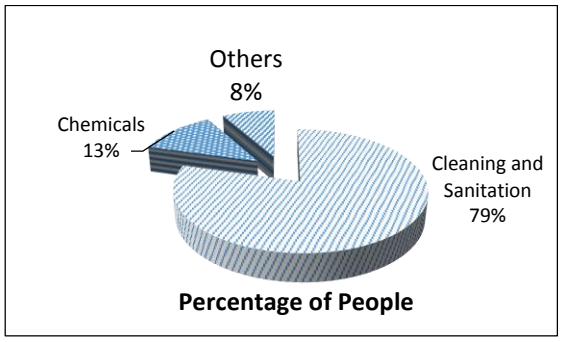

Figure 3. People perception for control of cockroaches in different ways

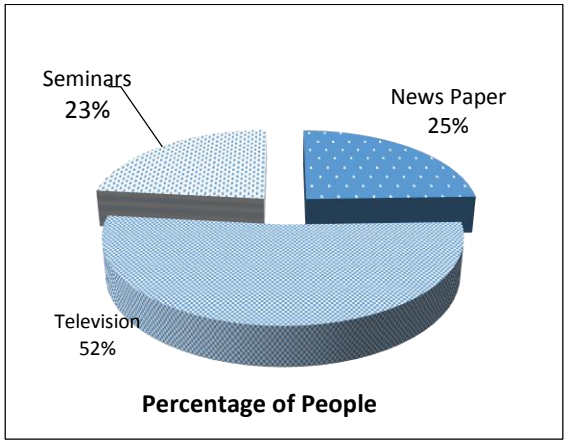

Figure 4. Better way of training for control of cockroaches among people of Southern Punjab, Pakistan

Table 1. Living standards of people in Southern Punjab, Pakistan

Sr. No	Variables	Category	Multan	Rajan pur	Muzaffargarh	Kot Addu	Faislabad	Total
			n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
1	Gender	Male	71 (39.9)	72 (55.4)	46 (70.8)	43 (64.2)	24(40.0)	256 (51.2)
		Female	107 (48.3)	58 (44.6)	19 (29.2)	24 (35.8)	36 (60.0)	244 (48.8)
2	Education	Yes	176 (98.9)	129(99.2)	64 (98.5)	66 (98.5)	59 (98.3)	494 (98.8)
		No	2 (1.1)	1 (0.8)	1 (1.5)	1 (1.5)	1 (1.7)	6 (1.2)
3	Age	18 years	101 (56.7)	42 (32.3)	6 (9.2)	8 (11.9)	5 (8.3)	162 (32.4)
		18-40years	62 (34.8)	78 (60.0)	41 (63.1)	41 (61.2)	33 (55.0)	255 (51.0)
		< 40 years	15 (8.4)	10 (7.7)	18 (27.7)	18 (26.9)	22 (36.7)	83 (16.6)
4	Occupation	Govt. employ	10 (5.6)	10 (7.7)	4 (6.2)	8 (11.9)	4 (6.7)	36 (7.2)
		Business man	10 (5.6)	5 (3.8)	1 (1.5)	6 (9.0)	4 (6.7)	25 (5.2)
		Farmer	9 (5.1)	4 (3.1)	1 (1.5)	0 (0.0)	0 (0.0)	14 (2.8)
		Students	149 (58.3)	111(85.4)	59 (90.8)	52 (77.6)	52 (86.7)	423 (84.6)
		Others	0 (0.0)	0 (0.0)	0 (0.0)	1 (1.5)	0 (0.0)	1 (0.2)
5	Area of	5 marla	46 (25.8)	31 (23.8)	17 (26.2)	19 (28.4)	17 (28.3)	130 (26.0)
	House	5-10 marla	63 (35.4)	40 (30.8)	24 (36.9)	19 (28.4)	21 (35.0)	167 (33.4)
		10-20 marla	45 (25.3)	38 (29.2)	14 (21.5)	18 (26.9)	14 (23.3)	129 (25.8)
		Greater than 20 marla	23 (12.9)	21 (16.2)	10 (14.3)	11 (16.4)	8 (14.4)	73 (14.8)
6	Age of	5 years	56 (31.5)	39 (30.0)	17 (26.2)	20 (29.9)	15 (25.0)	147 (29.4)
	House	5-20 years	63 (48.9)	50 (38.5)	26 (40.0)	19 (28.4)	24 (40.0)	182 (36.4)
		Greater than 20 years	59 (33.2)	41 (31.5)	22 (33.8)	28 (41.8)	21 (35.0)	171 (34.2)
7	House	Kaccha	0(0.0)	0(0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
	Construction	Pakka	178 (100)	130 (100)	65 (100)	67 (100)	60 (100)	500 (100)
8	Cleaning of	Daily	163 (91.6)	121(93.1)	62 (95.4)	63 (94.0)	57 (95.0)	466 (93.2)
	Dustbin	After two days	0 (0.0)	9 (6.9)	3 (4.6)	4 (6.0)	3 (5.0)	19 (3.8)
		After week	15 (8.4)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	15 (8.4)
		More than a week	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
9	Your sewerage	Yes	10 (5.6)	8 (6.2)	4 (6.2)	3 (4.5)	4 (6.7)	29 (5.8)
	Disorder	No	168 (94.4)	122(93.8)	61 (93.8)	64 (95.5)	56 (93.4)	471 (94.2)

Table 2. Information about identification, presence of insect pest specially cockroach in house

Sr. No	Variables	Category	Multan	Rajan pur	Muzaffargarh	Kot Addu	Faislabad	Total
			n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
1	Do you know	Yes	173 (97.2)	123(94.6)	59 (90.8)	61 (91.0)	54(90.0)	470 (94.0)
	any insect pest	No	5 (2.8)	7 (5.4)	6 (9.2)	6 (9.0)	6 (10.0)	30 (6.0)
2	Which one	Cockroach	43 (24.2)	37 (28.5)	16 (24.6)	17 (25.4)	11 (18.3)	124 (24.8)
	Present in	House fly	53 (29.8)	38 (29.2)	17 (26.2)	21 (31.3)	22 (36.7)	151 (30.2)
	your house	Mosquito	51 (28.7)	37 (28.5)	20 (30.8)	20 (29.9)	15 (25.0)	143 (28.6)
		All and others	31 (17.4)	18 (13.8)	12 (18.5)	9 (13.4)	12 (20.0)	82 (16.4)
3	You identify	Yes	175 (98.3)	128(98.5)	64 (98.5)	65 (97.0)	58 (96.7)	490 (98.0)
	Cockroach	No	3 (1.7)	2 (1.5)	1 (1.5)	2 (3.0)	2 (3.3)	10 (2.0)
4	Is cockroach	Yes	130 (73.1)	118(90.8)	58 (89.2)	65 (97.0)	49 (81.7)	420 (84.0)
	serious problem	No	48 (26.9)	12 (9.2)	7 (10.8)	2 (3.0)	11 (18.3)	80 (16.0)
5	How much	High	38 (21.3)	31 (23.8)	10 (15.4)	18 (26.9)	32 (53.3)	129 (25.8)
	presence of	Medium	68 (38.2)	57 (43.8)	32 (49.2)	27 (40.3)	12 (20.0)	196 (39.2)
	cockroach damage	Low	72 (40.5)	42 (32.3)	23 (35.4)	22 (32.8)	16 (26.7)	175 (35.0)
6	Abundance	Autumn	25 (14.0)	28 (21.5)	10 (15.4)	14 (20.9)	0 (0.0)	77 (15.4)
	season of	Spring	118 (66.3)	64 (49.2	43 (66.2)	37 (55.2)	13 (21.7)	275 (55.0)
	Cockroach	Summer	26 (14.6)	16 (12.3)	8 (12.3)	10 (14.9)	47 (78.3)	107 (21.4)
		Winter	9 (5.1)	22 (16.9)	4 (6.2)	6 (9.0)	0 (0.0)	41 (8.2)
7	Which one	Kitchen	74 (41.6)	61 (46.9)	30 (46.2)	28 (41.8)	30 (50.0)	223 (44.6)
	is living place of	Bathroom	84 (47.2)	61 (46.9)	31 (47.7)	31 (46.3)	25 (41.7)	232 (46.4)
	Cockroach	Others	20 (11.2)	8 (6.2)	4 (6.2)	8 (11.9)	5 (8.3)	45 (9.0)
8	Habitat involved	Dark places and crevice	73 (41.0)	60 (46.2)	33 (50.8)	28 (41.8)	18 (30.0)	212 (42.4)
	in cockroach	Poor sewerage system	84 (47.2)	62 (47.7)	32 (49.2)	31 (46.3)	21 (35.0)	230 (46.0)
	Infestation	Proximity food & water	21 (11.8)	8 (6.2)	0 (0.0)	8 (11.9)	21 (35.0)	58 (11.6)

Results

In terms of the gender, 51.2% of total surveyed people from Southern Punjab were male whereas 70.8% of the interviewee was male in Muzaffargarh. The highest percentage of educated persons was 98.8% in Southern Punjab and 99.2% in Rajanpur. Information related to age of people, majority of surveyed people were lied between 18-40 years old. The respondents of different areas were compared with each other and it was found that 50% interviewee with 5-20 years old houses were from Multan. Comparing data in kaccha and pakka houses 100% people live in pakka houses. Data related to cleaning of dustbins in house showed that 93.2% people in Southern Punjab clean their house daily and 95.4% of people from Muzzafargarh clean their dustbins daily. Data regarding inoperative sewerage system showed that 94.2% of the interviewee in Southern Punjab and 95.5% of the interviewee in Faisalabad had no problem with sewerage system (Table1).

Data related with insect pest identification showed that 94% persons from Southern Punjab identify insect pest and 97.2% persons in Multan are familiar with insect pest. In Southern Punjab 30.2% of the people recognized the cockroach and 36.7% of the people from Faisalabad identified cockroach as insect pest. Data about cockroach identification revealed that 98% of the people were able to identify cockroaches in Southern Punjab, 98.5% of the people from Rajanpur and Muzafargarh claimed that they were able to identify cockroach. According to the Results about cockroache problem, 84% people in Southern Punjab said cockroaches created serious problem and 97% of the people from KotAddu had cockroach problem in their apartments. Survey results showed that 39.2% of the people in Southern Punjab told that cockroaches were harmful and 49.2% person from Muzaffargarh said that cockroaches were harmful to them. According to this survey, related to the information about season of abundant cockroach infestation 55% of the people in Southern Punjab agreed on spring season and 66% of the people from Multan and similarly, Muzzafargarh said spring season was favorable for cockroaches. In Southern Punjab, 46.4% of the people said that bathroom was the living site of cockroaches and 47.7% of the interviewee from Muzaffargarh said similarly, the bathrooms as their best breeding place. The 46% of the person said they lives in poor sewerage system in Southern Punjab and 49.2% people from Muzaffargarh face the problem of poor sewerage (Table 2).

Data about spreading of diseases due to cockroach in Southern Punjab, showed that 80% of the people perception in Pakistanis i.e fever and chronic symptoms like running nose and watery eyes included in others. (Figure1). In Southern Punjab 48% of the people gave reason about abundance of cockroaches in their houses that it was due to the poor sewerage system (Figure 2). In southern Punjab, 79% of the People had perception for control of cockroaches was cleaning and sanitation (Figure 3). As the better way of training regarding the control of cockroaches, among 52% of the people of Southern Punjab, Pakistan responded that it would be through the television (Figure 4).

Discussion

Almost 50% of Pakistan's population lives in province Punjab (Anonymous, 2014a). The percentage of young people in Pakistan were maximum that was focused to acquire knowledge. (Anonymous, 2014b; Anonymous, 2014c). Education had a significant impact on behavior and knowledge of the person facing a specific problem and its management (Hannum and Claudia, 2006). Area and age of the house describes why lesser number of houses have good sanitary conditions and larger the area of the house will result in more difficulty in maintaining hygienic conditions and also older houses have more cracks and crevices for insect multiplication (English, 1987; Olanrewaju and Akinbamijo, 2002). Majority of people clean their houses regularly for maintaining hygienic conditions to control mobile pests especially cockroaches living in sewerage systems, bathrooms or cracks and crevices of houses which are not cleaned in routine of work (Rivault, 1993; WHO, 1997). When the cockroaches in houses find suitable conditions for growth and development, they create severe problem in houses (Cochran, 1999). Having poor sewerage was the biggest reason for the severe problem created by cockroaches in houses (Oyedele, 2009). Due to severe infestation by cockroach people claimed that they were able to identify cockroaches. People were aware of the disease transmission capability of cockroaches but most of them were unable to identify name of specific disease because of lack of health related knowledge and professional education. However smaller fraction of people was able to identify as named allergy, asthma and diarrhea transmitted commonly by cockroaches in a majority of areas of the world (Liccardi et al., 2000; Birnbaum et al., 1995; Bernton and Brown, 1964). People gave opinion that poor sewerage system was the reason of severe infestation of cockroaches in houses. Mass media especially television created great impact on people able producing hygienic condition and majority of people gave their view that the best way of training the community for the

management was through TV broadcasts (Morgan and Rothschild, 1983).

Conclusion

Education has significant effects on behavior of persons related to a particular problem so educated community of Southern Punjab; Pakistan was concentrated for the study. Basic information and preventive measures play an important role in management of insect-pests. This study would help to developed IPM strategies according to the community knowledge related with cockroaches. Cleaning and maintaining hygienic conditions in houses only was found the mostly used method for the management of cockroaches in houses but this method was not sufficient for management of cockroaches because of the fact that cockroaches breed in bathrooms and sewerage systems. Proper guidance about cockroaches and diseases associated with them should be provided to the community for better management of cockroaches.

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