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Folklores to facts: Human Psychology toward Insects in Punjab, Pakistan

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SUMMARY

Insects are the most abundant animals on the planet and have various impacts on humans. Invertebrates, with a few exceptions, are generally disliked. This widespread hatred can be attributed to our preference for animals that are aesthetically pleasing or similar to humans, as well as those that are considered beneficial to us. These perceptions strongly influence how we understand, interact with, and manage insects. Because humans unlike many species of insects due to cultural norms, folklore, and other economic factors, this study was designed to understand human interactions with insects in Punjab, Pakistan. We randomly chose 300 people from the crowds and described the goal of our study. We collected data about the views and common philosophies of respondents to understand how Punjabis feel about insects. We noted that most people don't have knowledge about insect species, and they feel creeped out and/or dislike cockroaches, houseflies, ants, lice, and mosquitoes, even though these species are involved in disease transmission and/or directly harm humans. Humans fear honeybees and wasps because both have stings, even though honeybee products are commonly used in society. People in the area like butterflies, fireflies, beetles, dragonflies, and beetles. Locusts and grasshoppers are liked and even eaten in some places in south Punjab. In conclusion, people in Punjab often have negative thoughts towards insects. People often kill insects, such as cockroaches and mosquitoes, for personal reasons. Additionally, insects that cause harm to crops are eradicated using pesticides. It is worth noting that cultural, folklore, and psychological aspects significantly impact human attitudes towards insects.

Keywords: Insects, Human, Conservation, Fear, Interaction

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INTRODUCTION

Insects are the most abundant animals on the planet and have various impacts on humans (Cardoso et al., 2011). According to studies by Bart (1972), Kellert (1993), and Woods (2000), invertebrates, with a few exceptions, are generally disliked. This widespread aversion can be attributed to our preference for animals that are aesthetically pleasing or similar to humans, as well as those that are considered beneficial to us. These perceptions strongly influence how we understand, interact

with, and manage insects. However, recent studies (Hogue, 1987; Lorimer, 2007; Evans, 2008; Lemelin, 2013) have observed that human encounters with insects can also be positive. Whether the interactions are negative, positive, or uncertain, there are numerous factors that influence how we interact with insects. These factors include physical signs like auditory, visual, and olfactory cues (Estren, 2012), early childhood experiences, the portrayal of insects in popular culture, education, and scientific literature (Millard and Marsh, 2000; Boileau and Russell, 2020), as well as the complex relationships between multiple species in various activities and locations (Gillott, 2005; Lemelin et al., 2016; Shipley and Bixler, 2017).

The use of pesticides has been linked to a considerable decrease in beneficial insect species, disturbing ecological balance and diminishing biodiversity (Ndakidemi et al., 2016). While insecticides are primarily used to control pest species, they frequently have unexpected implications for non-target creatures (Sánchez-Bayo, 2021), including beneficial insects like pollinators and natural predators (Brittain et al., 2010; Brittain et al., 2010; Sponsler et al., 2019; Serrão et al., 2022). The loss of these beneficial insects can have wide-ranging effects on ecosystem health, and food web (Kumar et al., 2018). Because human unlike many species of insects due to cultural norms, folklores, and other economic factors. So this research was designed to know the human interaction with insects in Punjab, Pakistan.

MATERIALS AND METHODS

STUDY AREA

Punjab is a fertile (Gosal, 2004), and agricultural land (Kijne and Kuper, 1995; Abid et al., 2021). Punjab has a huge social influence due to its size (Figure 1). It is Pakistan's most populous province, having a diverse range of ethnic and cultural groupings. With influences from many dynasties, including the Mughal, Sikh, Mauryan, and Gupta empires, as well as historic civilizations like the Indus Valley Civilization, Punjab's historical significance is abundantly visible (Ahmad et al., 2008; Shah and Amjad, 2011).

PROCEDURE

We chose 300 people at random from the crowds and described the goal of our study and the approach we would utilize. We only collected information about insects (Table 1) from users who freely joined up, and we committed to keeping that information private. To guarantee that everyone was managed equitably, we conducted all the interviews and questions in the same way. They were also handed a brief booklet with photographs of animals involved in the study. All surveys were done throughout the day, between 8:00 a.m. and 7:00 p.m. After obtaining the data, we created a small pamphlet that went into further depth about the animals we were examining and their importance to the environment. This was done to remove any misconceptions or ambiguities that anyone could have had. The entire process of acquiring and distributing information took around 25 minutes.

QUESTIONNAIRE PREPARATION

We collected data about the views and common philosophies of respondents to understand how Punjabis feel about insects. We did our research by reading books and records on these species and interviewing a range of people, including university specialists in ecology, biology, and sociology. For each question, each responder was assigned zero (0) to two (2) marks based on whether they disagreed (n=0), agreed

(n=1), or strongly agreed. It consisted of the following items: taxonomic characteristics, effects, folklore, threats, and conservation.

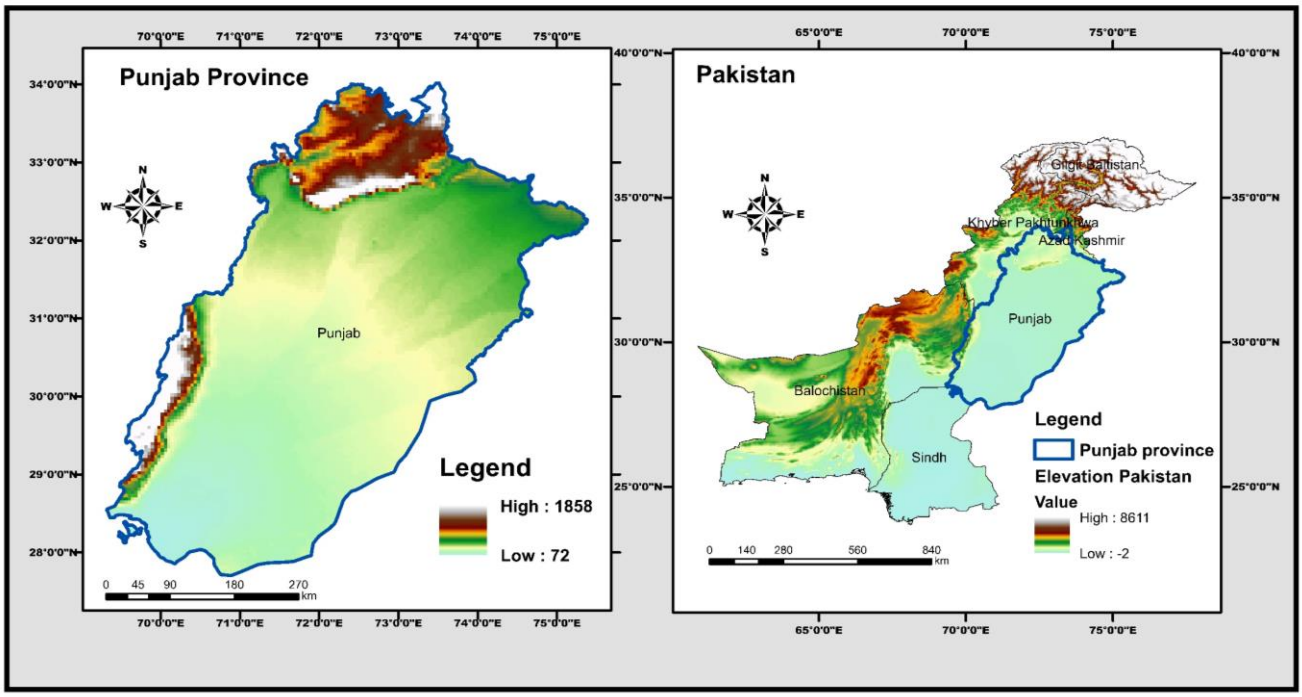

Figure 1: Map of Punjab.

STATISTICAL ANALYSES

To simplify and interpret substantial amounts of data, we employed a process known as "Principal Component Analysis" (PCA), which splits the data into independent pieces that can be more readily studied and analyzed.

Table 1: List of Insects Present in Punjab, Pakistan.

Sr.	English Name	Scientific Name
1	Cotton bollworm	*Helicoverpa armigera* (Hübner, 1808)
2	Bird cherry-oat aphid	*Rhopalosiphum padi* (Linnaeus, 1758)
3	Greenbug, or wheat aphid	*Schizaphis graminum* (Rondani, 1852)
4	Grain aphid	*Sitobion avenae* Fabricius 1756
5	Wheat weevil	*Sitophilus granarius* (Linnaeus, 1758)
6	Wheat midge	*Sitodiplosis mosellana* (Géhin, 1857)
7	Hessian fly or barley midge	*Mayetiola destructor* (Say, 1817)
8	Wheat stem sawfly	*Cephus cinctus*, Norton, 1872
9	Gramineous stem borer	*Sesamia inferens* (Walker, 1856)
10	Red flour beetle	*Tribolium castaneum* (Herbst, 1797)
11	Rice weevil	*Sitophilus oryzae* (Linnaeus, 1763)
12	Lesser grain borer	*Rhyzopertha dominica* (Fabricius, 1792)
13	Rusty grain beetle	*Cryptolestes ferrugineus* (Stephens, 1831)
14	Cowpea weevil	*Callosobruchus maculatus* (Fabricius, 1775)
15	Khapra beetle	*Trogoderma granarium* Everts, 1898
16	Rock bee	*Apis dorsata* Fabricius, 1793

17	Dwarf honeybee	*Apis florea* Fabricius, 1787
18	Red-coloured potter wasp	*Delta dimidiatipenne* (Saussure, 1852)
19	Potter wasp	*Delta esuriens* (Fabricius, 1787)
20	Oriental hornet wasp	*Vespa orientalis* Linnaeus, 1771
21	Bee	*Megachile bicolor* (Fabricius, 1781)
22	Cotton jassid	*Amrasca biguttula* Ishida, 1912
23	Whitefly	*Bemisia tabaci* (Gennadius, 1889)
24	Thrips	*Thrips tabaci* Lindeman, 1889
25	Cotton Mealybug	*Phenacoccus solenopsis* Tinsley, 1898
26	Dusky cotton bug	*Oxycarenus laetus* Kirby, 1891
27	Gossamer damselfy	*Ischnura aurora* (Brauer, 1865)
28	Yellow waxtail	*Ceriagrion Coromandel Anum* (Fabricius, 1798)
29	Slender skimmer	*Orthetrum sabina* (Drury, 1770)
30	Crimson-tailed marsh hawk	*Orthetrum pruinosum* (Burmeister, 1839)
31	River heliodor	*Libellago lineata* (Burmeister, 1839)
32	African threadtails	*Elattoneura atkinsoni* Selys, 1886
33	Damselfly	*Elattoneura souteri* (Fraser, 1924)
34	Damselfly	*Aciagrion hisopa* (Sélys, 1876)
35	Pygmy wisp	*Agriocnemis pygmaea* (Rambur, 1842)
36	Narrow-winged damselflies	*Agriocnemis nana* Laidlaw, 1914
37	Common bluetail damselfly	*Ischnura senegalensis* (Rambur 1842)
38	Elegant sprite or three striped	*Pseudagrion decorum* (Rambur, 1842)
39	Black and yellow bambootail	*Elattoneura tetrica* (Laidlaw, 1917)
40	Damselfly	*Drepanosticta polychromatica* Fraser, 1931
41	Golden-ringed	*Cordulegaster brevistigma* (Selys 1854)
42	Clubtails	*Onychogomphus bistrigatus* Selys, 1854
43	Spine-legged redbolt	*Rhodothemis rufa* (Rambur, 1842)
44	Black-tailed skimmer	*Orthetrum cancellatum* (Linnaeus, 1758)
45	Black ground skimmer	*Diplacodes lefebvrii* (Rambur, 1842)
46	Chalky percher or ground skimmer	*Diplacodes trivialis* (Rambur, 1842)
47	Blue-tailed Forest hawk	*Orthetrum triangulare* (Selys, 1878)
48	Common skimmer	*Sympetrum decoloratum* Selys 1884
49	Globe skimmer or wandering glider	*Pantala flavescens* (Fabricius, 1798)
50	Asian pintail, trumpet tail	*Acisoma panorpoides* Rambur, 1842
51	Eastern Crested Grasshopper	*Dericorys tibialis* (Pallas, 1773)
52	Rice Grasshopper	*Oxya hyla hyla Serville*, 1831
53	Rice Grasshopper	*Oxya velox* (Fabricius, 1787)
54	Rice Grasshopper	*Hieroglyphus perpolita* (Uvarov, 1933)
55	Rice Grasshopper	*Hieroglyphus banian* (Fabricius, 1798)
56	Long-horned cylindric grasshopper	*Tropidopola Longicornis longicornis* (Fieber, 1853)
57	Short-horned grasshopper	*Diabolocatantops innotabilis* (Walker, 1870)
58	Red-spined tree locust	*Anacridium aegyptium* (Linnaeus, 1758)
59	Rose winged grasshoppers	*Chondracris rosea* (De Geer, 1773)

60	Desert locust	*Schistocerca gregaria* Forsskål, 1775
61	Short-horned grasshopper	*Sphodromerus undulatus undulatus (*Kirby, 1914)
62	Short-horned grasshopper	*Acorypha glaucopsis* (Walker, 1870)
63	Short-horned grasshopper	*Sphodromerus undulatus salinus* Uvarov, 1943
64	Short-horned grasshopper	*Sphodromerus undulatus pedestris* Uvarov, 1943
65	Short-horned grasshopper	*Eyprepocnemis alacris* (Serville, 1838)
66	Red-winged grasshopper	*Oedipoda miniata* (Pallas, 1771)
67	Color winged grasshopper	*Oedipoda fedtschenki fedtschenki* Saussure, 1884
68	Blue-winged grasshopper	*Oedipoda caerulescens* (Linnaeus, 1758)
69	Short-horned grasshopper	*Duroniella laeviceps* Uvarov, 1938
70	Short-horned grasshopper	*Duroniella laticornis* (Krauss, 1909)
71	Slant-faced grasshoppers	*Gelastorhinus semipictus* (Walker, 1870)
72	Short-horned grasshoppers	*Gonista rotundata Uvarov, 1933*
73	Short-horned grasshoppers	*Phlaeoba panteli* Bolívar, 1902
74	Short-horned grasshoppers	*Leionotacris bolivari* (Uvarov, 1921)
75	Tawny grasshopper	*Stenohippus mundus* (Walker, 1871)
76	Short-horned grasshoppers	*Stenohippus trapezoidalis (Bolívar, 1914)*
77	Short-horned grasshoppers	*Stenohippus xanthus* (Karny, 1907)
78	Cylindrical slant-faced	*Mesopsis cylindricus* (Kirby, 1914)
79	Indus short-horned grasshoppers	*Chorthippus (Chorthippus) indus Uvarov, 1942*
80	Slant-faced grasshoppers	*Crucinotacris decisa (*Walker, 1871)
81	Slant-faced grasshoppers	*Acrida exaltata* (Walker, 1859)
82	Band winged grasshoppers	*Sphingonotus savignyi savignyi* Saussure, 1884
83	Short-horned grasshopper	*Scintharista notabilis pallipes* Uvarov, 1941
84	Short-horned grasshopper	*Chloebora grossa* Saussure, 1884
85	Short-horned grasshopper	*Acrotylus humbertianus* Saussure, 1884
86	Band winged Locust	*Gastrimargus africanus sulphureus* Bey-Bienko, 1951
87	Migratory Locust	*Locusta migratoria migratoria* (Linnaeus, 1758)
88	Spotted Meadow Katydid	*Conocephalus (Anisoptera) maculatus* (Le Guillou, 1841)
89	Conehead Katydid	*Euconocephalus incertus* (Walker, 1869)
90	False Katydid	*Trigonocorypha unicolor* (Stoll, 1813)
91	Red cotton stainer/bug	*Dysdercus koenigii* (Fabricius, 1775)
92	Red cotton stainer/bug	*Dysdercus cingulatus* (Fabricius, 1775)
93	Japanese beetle	*Popillia cyanea* Hope, 1831
94	Date palm fruit stalk borer	*Oryctes elegans* Prell, 1914
95	Smaller green flower chafer	*Gametis jucunda* (Falderman, 1835)
96	Scarab beetles	*Drepanocerus setosus* (Wiedemann, 1823)
97	Scarab beetles	*Oniticellus pallens* Castelnau, 1840
98	Antlion	*Indopalpares pardus* (Rambur, 1842)
99	Antlion	*Parapalpares solidus* (Gerstaecker, 1894)
100	Bumble bee	*Bombus haemorrhoidalis* Smith 1852
101	Fireflies	*Abscondita terminalis* (Olivier)

102	Fireflies	*Asymmetricata ovalis* (Hope)
103	Longhorned beetle	*Niphona fuscatrix* Fabricius, 1792
104	Ladybird beetle	*Harmonia eucharis* Mulsant, 1853
105	Leaf beetle	*Altica* sp
106	Snout beetle	*Hylobius angustus* Faust, 1891
107	Click beetle	*Melanotus lobeli* Platia & Scimmel, 2001
108	Stag beetle	*Dorcus sewertzowi* Semenov, 1891
109	Blister beetle	*Hycleus phaleratus* Pallas, 1781
110	Fruit chaffer	*Protaetia coenosa* Westwood, 1849
111	Non coprophagous	*Chilotrogus stoliczkae* Sharp, 1878
112	Necrophagous	*Necrodes littoralis* Linnaeus, 1758
113	Necrophagous	*Necrophorus nepalensis* Hope, 1831
114	Stink bug	*Halyomorpha picus* (Fabricius, 1794)
115	Coprophagous	*Catharsius pithecius* (Fabricius, 1775)
116	Indian cabbage white butterfly	*Pieris canidia* (Sparrman, 1768)
117	White cabbage butterfly	*Pieris brassicae* (Linnaeus, 1758)
118	African emigrant butterfly	*Catopsilia florella* (Fabricius, 1775)
119	Common grass yellow butterfly	*Eurema hecabe* (Linnaeus, 1758)
120	Plain tiger butterfly	*Danaus chrysippus* (Linnaeus, 1758)
121	Blue pansy	*Junonia orithya* (Linnaeus, 1758)
122	Painted Lady	*Vanessa cardui* (Linnaeus, 1758)
123	Common castor	*Ariadne merione* (Cramer, 1777)
124	Shoot borer moth	*Leucinodes orbonalis* Guenée, 1854
125	Rice leafroller moth	*Cnaphalocrocis medinalis* (Guenée, 1854)
126	Honeycomb moth	*Galleria mellonella* (Linnaeus, 1758)
127	Lesser wax moth	*Achroia grisella* (Fabricius, 1794)
128	Rice moth	*Corcyra cephalonica* (Stainton, 1866)

RESULTS

As shown in Figure 2, we interviewed 300 respondents (male=227 and female=73) in total, who ranged in age from 15 to 75. We have selected educated (n=245) and uneducated respondents (n=55). We collected data from rural communities (n=134) and urban respondents (n=166). The respondents of the Punjab have different professionals i.e., students, teachers, shepherded, doctor, engineer, laborer, farmer, and fisher (Figure 2). We observed that many people lack knowledge about different insect species. They often feel uncomfortable or even dislike certain insects such as cockroaches, houseflies, ants, lice, and mosquitoes. However, it's important to note that these species are known for transmitting diseases and causing direct harm to humans. On the other hand, humans are often fearful of honeybees and wasps due to their stings, despite the fact that honeybee products are widely used in society. In the area, people tend to have a liking for butterflies, fireflies, beetles, dragonflies, and

ladybugs. Interestingly, locusts and grasshoppers are not only liked but also consumed in some regions of South Punjab.

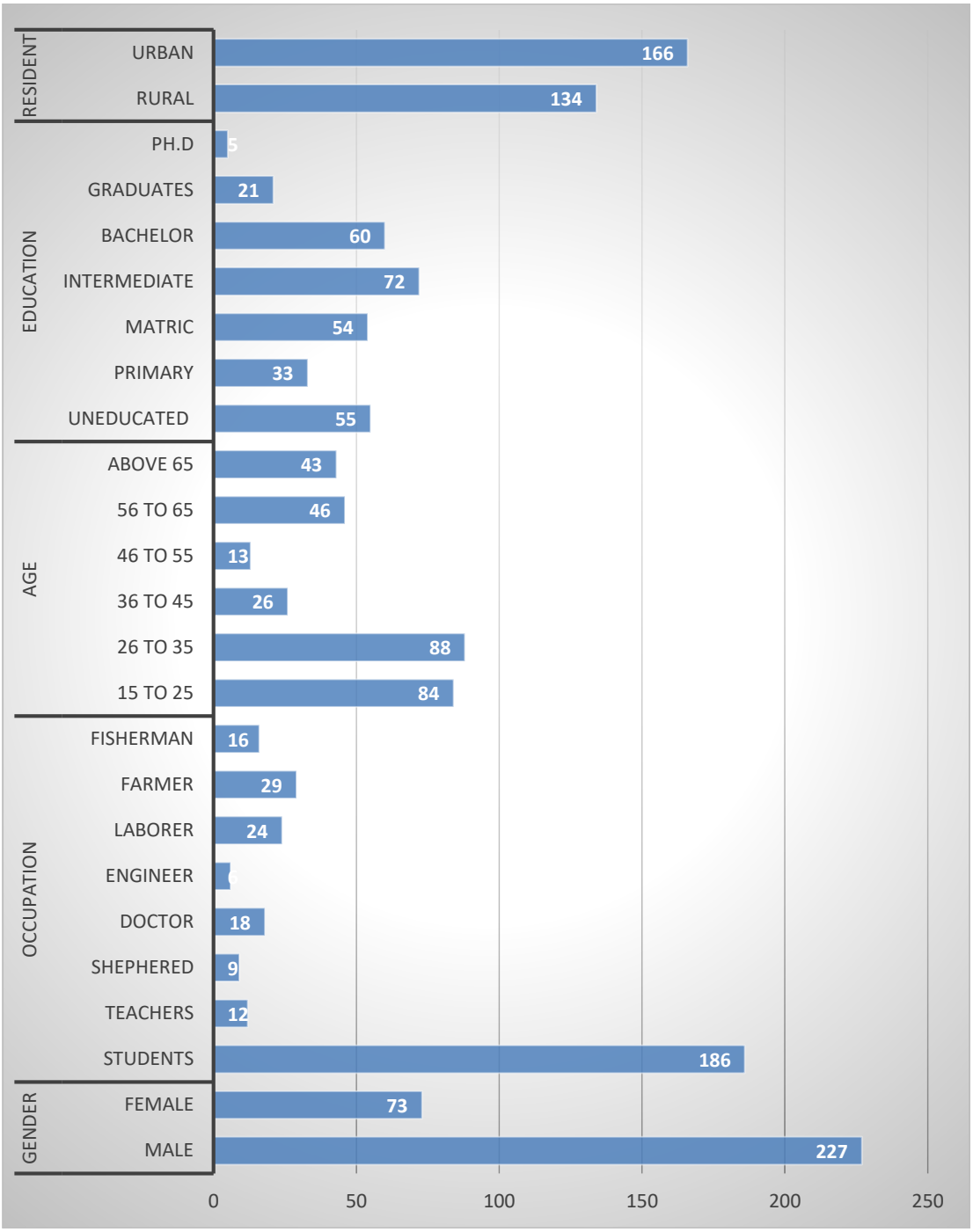

Figure 2: Profile of the respondents.

The first two axes of the Principal Component Analysis (PCA) explained 48.676% of the variance in people's opinions towards herpetofauna. Component 1 supplied 36.499% of the variance, whereas Component 2 contributed 12.177%. Component 1 was influenced by various variables, including; I like this insect (negatively correlated: -0.53226), This insect is beautiful (negatively correlated: -0.48279), I avoid this insect (positively correlated: 0.27637), I am sick of these insects (positively correlated: 0.39551), I fear this insect (positively correlated: 0.36778), I like the

voices this insect (positively correlated: 0.12531), This insect is useful for human beings (positively correlated=-0.10861), this insect is harmful for human beings (positively correlated: 0.20626), this insect is harmful for poultry & pet (positively correlated: 0.048455), this insect is harmful for fishes (positively correlated: 0.022148), this insect is harmful for crops and fruits (positively correlated: 0.048571), this insect is attack human beings (positively correlated: 0.20026), this insect is ignore human beings (correlated: -0.00233), this insect is usually run away from humans (positively correlated: 0.012371), the way the animal moves gives me the creeps (positively correlated: 0.005581), and these insects gives me nightmares (positively correlated: 0.003475).

These variables show the wide range of human attitudes towards insects. In Component 2, we observed correlations with various variables: I like this insect (positively correlated: 0.32832), this insect is beautiful (positively correlated: 0.34447), I avoid this insect (correlated: -0.32435), I am sick of these insects (positively correlated: 0.26026), I fear this insect (positively correlated: 0.25468), I like the voices this insect (positively correlated: 0.41658), this insect is useful for human beings (positively correlated: -0.15677), this insect is harmful for human beings (positively correlated: 0.39003), this insect is harmful for poultry & pet (positively correlated: 0.001202), this insect is harmful for fishes (positively correlated: 0.099492), this insect is harmful for crops and fruits (positively correlated: -0.02281), this insect is attack human beings (positively correlated: 0.41465), this insect is ignore human beings (correlated: -0.05559), this insect is usually run away from humans (positively correlated: 0.005733), the way the animal moves gives me the creeps (positively correlated: 0.003022), and these insects gives me nightmares (positively correlated: 0.003917) in Figure 3, 4. There were no significant relationships between numerous variables and other PCA components, showing that human interactions dominated the process of producing insect variety.

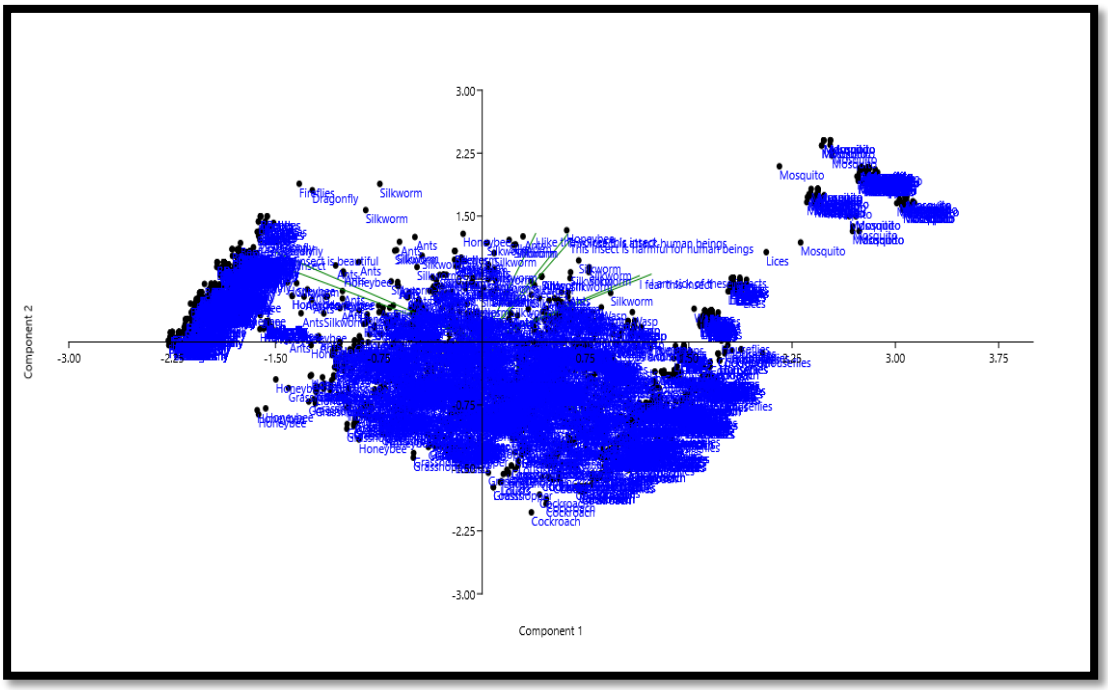

Figure 3: PCA for human behavior towards Insects species.

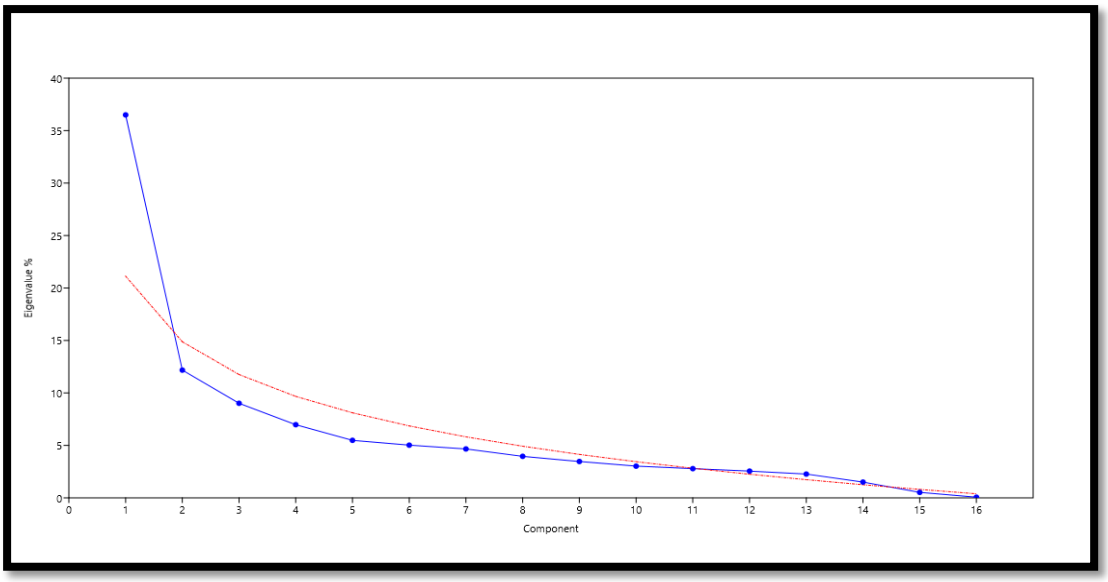

Figure 4: Eigenvalue compared with components of human behavior towards Insect species.

In the PCA analysis, the top two axes significantly explained 92.725% of the variation in respondents' attitudes toward herpetofauna conservation. Component 1 was responsible for 76.579% of the variation, whereas Component 2 was responsible for 16.146%. The variables when I find one of these insects, I usually kill it or ask someone to kill it (positive correlation: r = 0.44017), If there was a population of these insects in my property I would take measures to eliminate it (positive correlation: r = 0.64234), and I think that these insects should be exterminated (positive correlation: r = 0.62742) were all linked to Component 1.

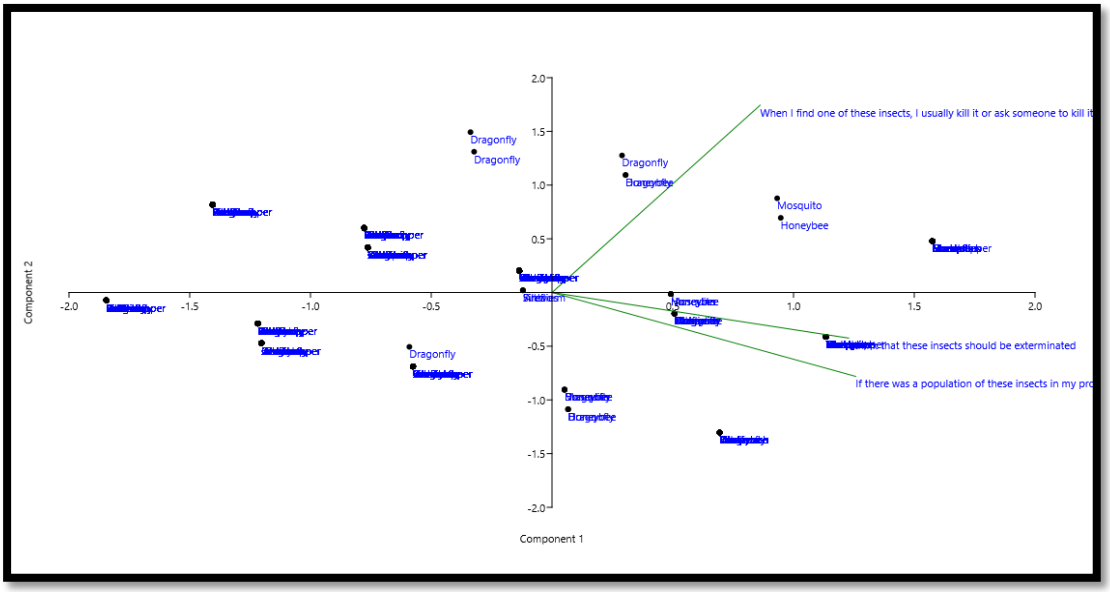

Figure 5: PCA for human behavior for conservation of Insect species.

For example, Component 2's variables when I find one of these insects, I usually kill it or ask someone to kill it (positive correlation: r = 0.89101), If there was a population of these insects in my property I would take measures to eliminate it (negative correlation: r = -0.39893), and I think that these insects should be

exterminated (correlation: r = -0.21669) as shown in Figures 5, 6; all had correlations with each other. Importantly, none of the primary components demonstrated a substantial relationship with the previously described factors. Component 2 yielded avian community trends that were unrelated to those explained by Component 1. The fact that most habitat variables had no significant links with other PCA components offered additional evidence that human influence was the primary factor impacting the insect population.

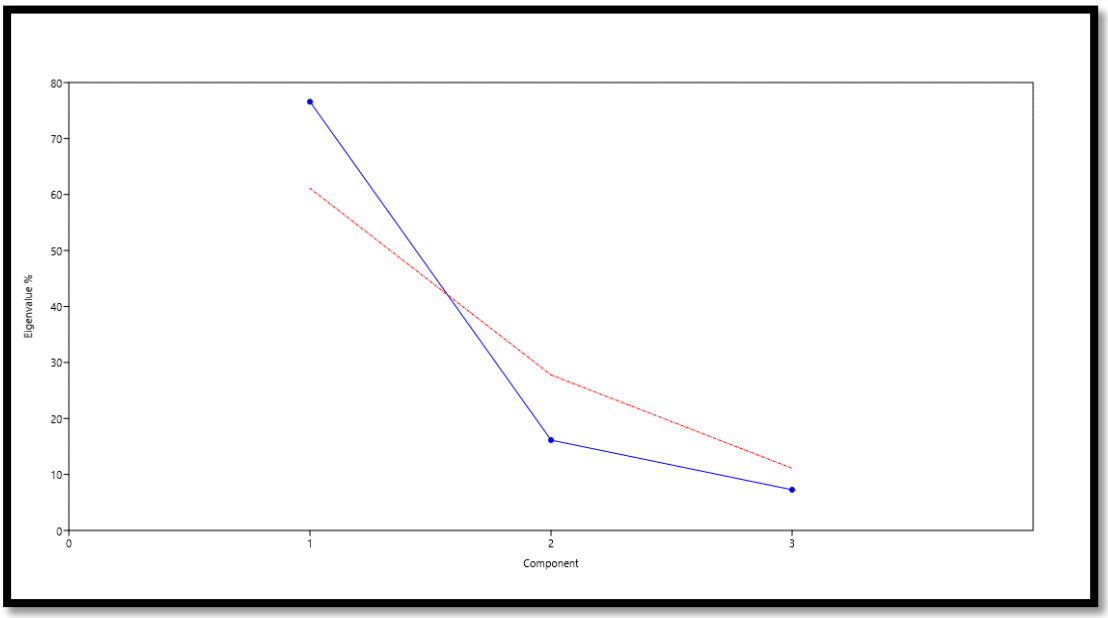

Figure 6: Eigenvalue compared with components of human behavior PCA for human behavior for conservation of Insect species.

DISCUSSION

Indeed, fear of harmful insects in one's original environment might cause individuals to travel to locations where such insects are scarce or non-existent (McGavin and Davranoglou, 2023). This tendency is especially noticeable in areas where insects transmit serious health hazards, such as malaria or dengue fever virus. In such instances, people may seek sanctuary in locations where insect-borne illnesses are less common, such as metropolitan areas or regions with greater public health infrastructure. However, when people move to new locations, they may come across novel bug species or insects that seem similar and activate their pre-existing fear or aversion.

Human have interaction with insects in various ways (Brody et al., 1995; Zinn and Pierce, 2002; Kaltenborn et al., 2006; Lemelin et al., 2016; Lesnik, 2019; Tuccillo et al., 2020; Riyaz, 2021; Özdemir, 2022; Fukano and Soga, 2023; Fukano and Soga, 2023; Fukano and Soga, 2023; Tlili, 2024), human psychology impact due to education, culture, folklores (Olkowski and Olkowski, 1976; Hardy, 1988; Shahriari-Namadi et al., 2018; Fukano and Soga, 2023). Education has a significant impact on how people view and interact with insects. It influences their attitudes, knowledge, and perceptions (Cornelisse and Sagasta, 2018; Khan et al., 2020). Research has shown that individuals with a greater knowledge of insects tend to have more positive attitudes towards them. They recognize insects as vital components of ecosystems rather than mere pests (Piha et al., 2018). Education also helps individuals understand the ecological roles that insects play, such as pollination, decomposition,

and pest control. This leads to a greater recognition and respect for the contributions of insects to environmental sustainability (Samways et al., 2020). Furthermore, education dispels myths and unfounded fears about insects by providing accurate information about their biology, behavior, and ecological significance. As a result, educated individuals are more likely to engage in conservation practices and advocate for appropriate insect management techniques. Ultimately, this helps to preserve insect biodiversity and promote ecological harmony (Ernst et al., 2013; Boileau and Russell, 2020).

CONCLUSION

It is concluded that people of Punjab often have negative thoughts towards insects. People often kill insects, such as cockroaches and mosquitoes, for personal reasons. Additionally, insects that cause harm to crops are eradicated using pesticides. It is worth noting that cultural, folklore, and psychological aspects significantly impact human attitudes towards insects.

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