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Diversity of mosquitoes in association with ecological factor from Buldhana district (MS). India

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Abstract
Present investigation on diversity and seasonal Abundance of mosquitoes associated with ecological factor from Buldhana district, Maharashtra state, India. mosquitoes were collected during period of year 2019-20 from different tahsil location of Buldhana district and all the adult mosquitoes were identified using standard identification keys of each genus. diversity of mosquitoes and abundance positively correlation with ecological factors and also results revealed that species diversity in winter higher than that of rainy period and summer. from all work concluded that the ecological factor is important for control of mosquito's population and also help in reduction of vector borne diseases.

Keywords: diversity, mosquitoes, abundance, Buldhana and ecological factor etc

Introduction

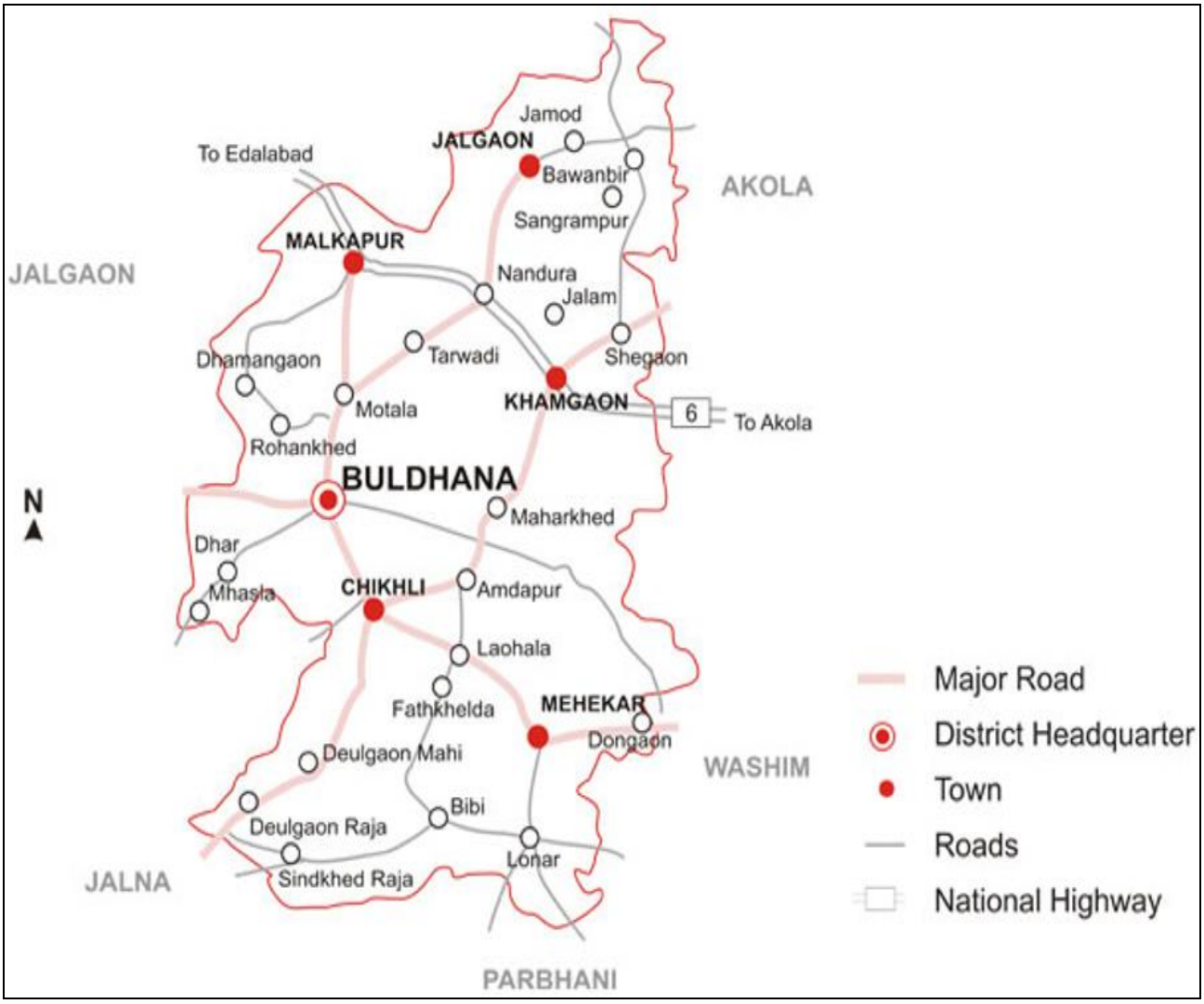
Mosquito**,** (family *Culicidae*), any of approximately 3,500 species of familiar insects in the fly order, Diptera, that are important in public health because of the bloodsucking habits of the females. Mosquitoes are known to transmit serious diseases, including yellow fever, Zika fever, malaria, filariasis, and dengue (Gubler *et al*, 1997) [3]. Mosquitoes are distributed worldwide in both tropical and temperate regions (Onyido *et al*, 2006) [1].

The abundance of mosquitoes in nature, provides a significant level of risk in the transmission of pathogens and nuisance to humans and increasing human morbidity and mortality to a disease epidemic (Moses *et al*, 2016) [2]. According to the latest *World malaria report*, released on 30 November 2020, there were 229 million cases of malaria in 2019 compared to 228 million cases in 2018. The estimated number of malaria deaths stood at 409 000 in 2019, compared with 411 000 deaths in 2018. The WHO African Region continues to carry a disproportionately high share of the global malaria burden. In 2019, the region was home to 94% of all malaria cases and deaths. In 2019, 6 countries accounted for approximately half of all malaria deaths worldwide: Nigeria (23%), the Democratic Republic of the Congo (11%), United Republic of Tanzania (5%), Burkina Faso (4%), Mozambique (4%) and Niger (4% each). Children under 5 years of age are the most vulnerable group affected by malaria; in 2019 they accounted for 67% (274 000) of all malaria deaths worldwide. Present investigation on diversity and seasonal Abundance of mosquitoes associated with ecological factor from Buldhana district, Maharashtra state, India. Earlier some pioneer scientist investigates the diversity and abundance of mosquitoes associated with ecological factor are as, Wilke *et al.*, 2016[4] in Brazil reported that the abundance of Ae. albopictus was not influenced by rainfall, but the abundance of Ae. scapularis and *Cx. nigripalpus* were affected by rainfall. This was due to variations in climate which provide different resistance for each species.

Valdez *et al*., 2018 [5], conducted a study using artificial rain method to analyse the effects of rainfall on Ae. aegypti populations in Taiwan. The results showed that the population of Ae. aegypti during the summer had decreased. In the summer, Ae. aegypti's survival increased, but the eggs became sterile due to prolonged dryness so that the abundance of Ae. aegypti was reduced. Poh *et al*. 2019 [6], reported in Texas, United States, it was found that weather factors provide significant impact to Cx. quinquefasciatus's abundance.

Material and Methods

Present investigation on diversity and abundance of mosquitoes carried out in shegaon, Buldhana and Deolgaon Raja tehsil of Buldhana, district Maharashtra, India which is located on 20.7930° N, 76.6910° E, 20.4561° N, 76.3637° E and 20.0186° N, 76.0339° E. Three sites densely populated area selected for collection of mosquitoes with help of entomological catching instrument during collection of mosquitoes also measured ecological factor during year 2019-2020. All the collected mosquitoes were identified using standard identification keys of each genus referred by (Barraud PJ,1934, Christopher's SR.1933, Qutubuddin M.1960, Reinert JF, Harbach RE, Kitching I.2004, Sirivanakarn S.1976, Knight KL, Stone A.1977, Reuben R, Tewari SC, Hiriyan J, Akiyama J 1994, Nagpal BN, Srivastava A, Saxena R, Ansari MA, Dash AP, Das SC. and Sanjay Karlekar & Raymond Andrew, 2015) [8, 10, 11, 12, 13, 14,].



Map 1: Site map of Research work

Results

Table 1: Ecological factor recorded from Buldhana District during 2019-2020

Name of Place	Parameters	Jan. 2019	Feb. 2019	Mar 2019	Apr. 2019	May. 2019	June 2019	July 2019	Aug. 2019	Sept. 2019
D. Raja	Temperature (°C)	30	39	40.1	41.1	43	30	28	28	30
	Humidity (%)	59	38	27	18	22	59	72	73	69
Buldhana	Temperature (°C)	29	37	40.2	40.2	42	29	27	29	31
	Humidity (%)	60	42	22	20	21	59	74	78	72
Shegaon	Temperature (°C)	31.1	37	42.1	41.3	42.2	28	29	27	29
	Humidity (%)	62	58	20	17	21.33	65	77	76	79

All results in three replicates

Table 2: Month wise diversity of collected mosquito species from Buldhana district

Sr. No.	Location	Jan. 2019	Feb. 2019	Mar. 2019	Apr. 2019	May 2019	June 2019	Jul 2019	Aug. 2019	Sept. 2019
1	D. Raja	155	88	201	312	354	259	167	203	264
2	Buldhana	189	94	224	285	289	278	154	182	247
3	Shegaon	150	87	194	258	314	165	155	163	261

Table 3: Genus wise collection of Mosquitoes found in Buldhana District

Sr. No.	Month in 2019-20	*Culex*	*Anopheles*	*Aedes*
1	January	27	49	38
2	February	24	39	29
3	March	44	71	42
4	April	68	97	53
5	May	72	133	74
6	June	98	128	88

7	July	138	162	126
8	August	182	127	147
9	September	92	89	97
Total		745	895	694
Percentage (%)		31.91	38.34	29.73

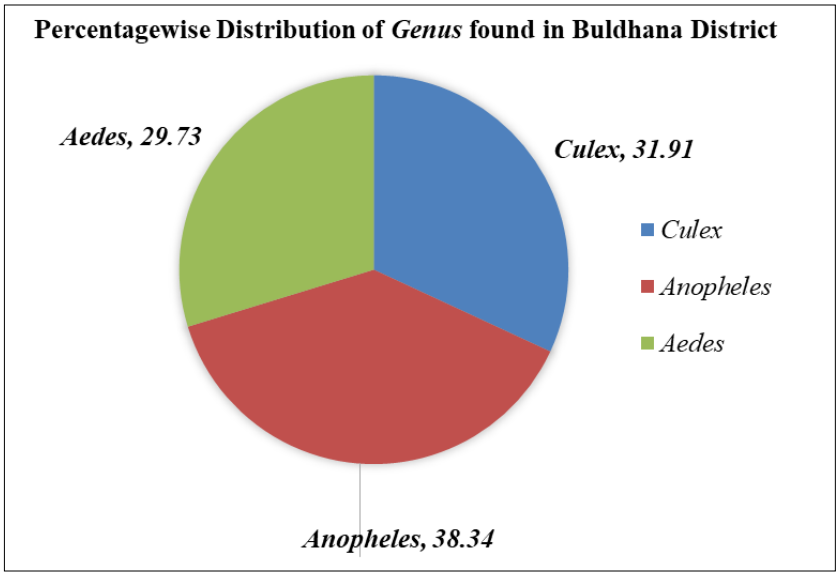


Fig 1

Present work carried out on seasonal abundances of mosquitoes, the highest population of mosquitoes *Anaphele* Genus in throughout year followed by *culex* species and *Aedes* species recorded from buldhana district. *Anaphele* Genus of mosquitoes observed highest in July (162) lowest in the month of February (39) from all collected mosquitoes at selected place with specific time, humidity and temperature mentioned in table. *culex* Genus highest recorded in the month of August (182) and lowest in the month of January (27) at specific humidity and temperature. Another genus Ades were collected highest in the month of August and July (147&127) respectively and lowest observed in the month of February and January (29, 38) respectively.

Discussion

Present work shows that mosquito's population positively correlation with climatic factor which help in suitable breeding and their development with changing climate with population of mosquito's prevalence's are changes. recently mosquito born diseases are serious issue in human civilization of our country so this study help in further studies of appropriate time of mosquito breeding and their development not only but also studies of different species abundance in period of year and record their profile also, further investigation carried with this collected mosquito *viz*, identification of mosquito species by the method of molecular techniques, 16s RNA or 16s DNA sequencing and collected mosquito use for isolation and identification of bacteria from its guts which serious cause diseases in human being.

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