

RECORDS OF MOSQUITOES (DIPTERA : CULICIDAE) FROM
MANIPUR : GENUS—AEDES

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INTRODUCTION

Aedine mosquitoes not only cause annoyance by blood sucking activities but also serve as main vectors for some important viral diseases like chikungunya and dengue (Myers *et. al.*, 1965 ; George and Soman, 1975). These diseases pose a serious health problem whenever they appear in the epidemic form.

The state of Manipur remained unknown for their aedine fauna except a record of most common *Aedes albopictus* and a forest species *Aedes albopictus* by Malhotra *et al.* (1983). The present communication deals with the records of *Aedes* mosquitoes collected during 1983 to 1985 from the state. During the surveys attempts were made to collect the adults and immatures as well. The immatures were reared upto adult in the laboratory and the identification was done mainly on adult characters. The genital characters and characters of larvae were also taken into consideration whenever those forms were available. For identification the works of Barraud (1934), Huang (1972 and 1977), Reinert (1970 and 1973), Knight (1946) was mainly consulted. The classification and nomenclature used here are mainly based on the synoptic catalogue of mosquitoes of the world (Knight and Stone, 1977). The physiography of the study area, materials and methods have already been described in the earlier communication (Rajput and Singh, 1986).

Collection Records :

Genus *Aedes*

1. *Aedes alboscuteellatus* (Theobald)

1905(a). *Lepidotomyia alboscuteellatus* Theobald, *Ann. hist-nat. Mus. Hung.* 3 : 80 ; Barraud, 1934 : 250-251 ; Reinert, 1973 : 17 ; Knight and Stone, 1977 : 73.

The species has its distribution range in Oriental to Australian region with a northward extension up to Japan. In India, recorded from Assam, Bihar, Maharashtra and West Bengal.

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Present records : Manipur : *Khongampat* (785 m.)—1 ♀ (16 Dec. '84) from herb vegetation.

2. *Aedes caecus* (Theobald)

1901. *Culex caecus* Theobald, *Monogr. Cul.* 1 : 413 ; Barraud 1934 : 257-258 ; Knight and Stone, 1977 : 74.

This species has a wide distribution in Oriental region. In India, the species has been recorded from Assam, Kerala, and West Bengal.

Present records : Manipur : *Chingmeirong* (785 m.)—1 ♀ (11 Sept. '83), coming to bite during day. *Khongampat* (785 m.)—1 ♂, 1 ♀ (27 Nov. '83), from herb vegetation. *Jiribam* (150 m.)—12 ♂♂, 2 ♀♀ (7 Oct. '84), larvae were reared from a rainy-pool with heavy decaying of saw-dust. *Moreh* (150 m.)—14 ♂♂, 1 ♀ (19 Aug. '84), from rainy-pool in forest. Associated breeders were *Anopheles kochi*, *Culex fuscocephala* and *C. mimulus*.

3. *Aedes vexans* (Meigen)

1830. *Culex vexans* Meigen, *Syst. Bechr.* 5 : 241 ; Barraud, 1934 : 253 ; Reinert, 1973 : 66 ; Knight and Stone, 1977 : 83.

The species has wide range of distribution in Holarctic region, Oriental region, British Honduras, Guatemala, Mexico, Pacific Islands, Papuan area and Transvaal. Distributed almost all over India.

Present records : Manipur : *Chandel* (1,500 m.)—2 ♂♂, 1 ♀ (22 Oct. '85) from forest vegetation. *Chingmeirong* (785 m.)—1 ♂, 33 ♀♀ (2 Oct. '83—25 Dec. '83), 39 ♂♂, 26 ♀♀ (22 Jan. '84—25 Sept. '84), collected from shrubby vegetation, 9 ♀♀ (6 Nov. '83—29 Nov. '83), 14 ♀♀ (3 Jun. '84—14 Oct. '84) from day-biting in field, 6 ♂♂, 7 ♀♀ (14 Apr. '84) from herb vegetation. *Kanglatongbi* (1,000 m.)—2 ♀♀ (12 Aug. '84) from herb vegetation. *Khongampat* (785 m.)—1 ♂, 21 ♀♀ (27 Nov. '83), 2 ♂♂, 3 ♀♀ (29 Jan. '84) from herb vegetation. *Khurkhul* (830 m.)—2 ♂♂, 3 ♀♀ (29 Jan. '84), from herb vegetation. *Langol-hill* (785 m.)—3 ♂♂, 7 ♀♀ and 3 ♂♂ (26 Jan. '84) from dried leaves and pit shelters respectively, 6 ♀♀ (29 Jul. '84) from pit shelters, 1 ♂ (19 Feb. '84) from shrubby vegetation. *Mantripukhri* (785 m.)—2 ♀♀ (13 Feb. '84) from human-bait, 4 ♀♀ (10 Jun. '84—29 Oct. '84) from bovine-bait. *Mao* (1,850 m.)—1 ♀ (9 Sept. '85) from human-bait. *Pheidinga* (900 m.)—2 ♀♀ (29 Jan. '84) from herb vegetation.

4. *Aedes iyengari* Edwards

1923. *Aedes iyengari* Edwards, *Bull. Ent. Res.* 14 : 4 ; Barraud, 1934 : 273-275 ; Reinert, 1970 : 10 ; Knight and Stone, 1977 : 88.

The species restricts its distribution in Burma., India, Indonesia and Thailand. The species is known from Manipur and West Bengal in India.

Present records : Manipur : *Moreh* (150 m.)—1 ♀ (18 Aug. '84), from shrubby forest.

5. *Aedes albolateralis* (Theobald)

1908. *Stegomyia albolateralis* Theobald *Rec. Indian Mus.* 2 : 289 ; Barraud, 1934 : 205-208 ; Knight and Stone, 1977 : 90 ; Malhotra *et al.*, 1983, 25(2) : 80-83.

The species has its distribution range in Oriental region and south western Palaearctic region. In India, it is recorded from Assam, Himachal Pradesh, Karnataka, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, Uttar Pradesh and West Bengal.

Present records : Manipur : *Kalinamei* (1,800 m.)—1 ♀ (8 Sept. '85) larva was reared from a bamboo-cut. *Mao* (1,850 m.)—7 ♀ ♀ (8 Sept. '85) from human-bait, 6 ♀ ♀ (9 Sept. '85) recorded from larvae from a tree-hole in forest. *Nungba* (750 m.)—4 ♀ ♀ (8 Oct. '84) collected biting during day in forest. The species associately breeds with *Aedes pseudalbopictus* and *Heizmannia complex*.

6. *Aedes chrysolineatus* (Theobald)

1907. *Howardina chrysolineatus* Theobald, *Monogr. Cul.* 4 : 218 ; Barraud, 1934 : 185-188 ; Knight and Stone, 1977 : 93.

This species has a wide distribution in Oriental region. In India, recorded from Karnataka, Maharashtra, Mizoram, Sikkim, and Tamil Nadu.

Present records : Manipur : *Khongampai* (785 m.)—1 ♂ (16 Dec. '84) from herbs below the trees.

7. *Aedes elsiae* Barraud

1923(a). *Aedes elsiae* Barraud, *Bull. Ent. Res.* 13 : 406 ; Barraud, 1934 : 180-883 ; Knight and Stone, 1977 : 94.

This species has been recorded from China, India, Kampuchea, Laos, Malaysia, Thailand and Vietnam. In India, it is recorded from Jammu & Kashmir, and Meghalaya.

Present records : Manipur : *Chandel* (Chiva river junction) (900 m.)—1 ♂, 1 ♀ (22 Oct. '85) larvae were reared from a rock pool at river margin. *Tamenglong* (1,200 m.)—4 ♂ ♂, 4 ♀ ♀ (Sept. '84) larvae reared from a pool on a pitch road. Associated breeder was *Aedes shortti*.

8. *Aedes formosensis* Yamada

1921. *Aedes formosensis* Yamada, *Annot. Zool. Jap.* 10 : 67 ; Barraud, 1934 : 189-190 ; Knight and Stone, 1977 : 95.

This is an Oriental species. In India, it is recorded from Assam, Meghalaya, Sikkim, Uttar Pradesh, and West Bengal.

Present records : Manipur : *Jiribam* (150 m.)—1 ♀ (2 Oct. '84), from banana-groves (*Musa balbisiana*). *Nungba* (750 m.)—2 ♀ ♀ (8 Oct. '84) from day-biting in forest.

9. *Aedes shortti* (Barraud)

1923(b). *Finlaya shortti* Barraud, *Bull. Ent. Res.* 13 : 405 ; Barraud, 1934 : 183-184 ; Knight and Stone, 1977 : 104.

The species is distributed in Oriental region. Recorded from Jammu & Kashmir, Meghalaya, Uttar Pradesh and West Bengal in India.

Present records : Manipur : *Chandel* (Chiva stream junction) (1,500 m.)—1 ♂, 1 ♀ and many larvae (22 Oct. '85) collected from rock-pools. The associative breeder *Aedes elsiae*.

10. *Aedes lineatopennis* (Ludlow)

1905. *Taeniorhynchus lineatopennis* Ludlow, *Can. Ent.* 37 : 133 ; Barraud, 1934 : 269-271 ; Knight and Stone, 1977 : 120.

This species has wide range of distribution in Oriental region, Australia, Eastern and Southern Africa, Gabon & Gold Coast, Nigeria, and Upper Volta. Recorded from throughout India.

Present records : Manipur : *Bullian* (775 m.)—1 ♀ (8 Oct. '83) from shrubby vegetation of *Lithocarpus dealbata*. *Chingmeirong* (785 m.)—4 ♂ ♂, 4 ♀ ♀ (18 Sept. '83—23 Oct. '83), 1 ♂, 5 ♀ ♀ (27 Jan. '84—13 Jul. '84) from day-biting, 2 ♀ ♀ (14 Oct. '83) were reared from larvae, collected from a shallow drain-pit. *Kwakta* (760 m.)—1 ♀ (8 Oct. '83) from shrubby vegetation. *Mantripukhri* (785 m.)—1 ♀ (15 Nov. '83) from human-bait, 5 ♀ ♀ (23 Jun. '84—9 Jul. '84) from bovine-bait, 2 ♂ ♂, 2 ♀ ♀ (4 Jul. '84—1 Nov. '84) from bulb-light.

11. *Aedes aegypti* (Linnaeus)

1762. *Culex aegypti* Linnaeus, *Hasselquist's Reise nach Palestina* : 470 ; Barraud, 1934 : 224 ; Knight and Stone, 1977 : 154.

The species is cosmotropical (within the 20°C isotherm) in distribution. Also recorded from Ryukyu Islands. In India, it is distributed all over the big cities except some hilly states.

Present records : Manipur : *Imphal* (785 m.)—20 ♂ ♂, 14 ♀ ♀ and 97 larvae (31 Jul. '85) from a discarded tyre dump. The associative breeders were *Aedes albopictus*, *Armigeres subalbatas*, *Culex quinquefasciatus*, and *C. fuscianus*.

12. *Aedes albopictus* (Skuse)

1894. *Culex albopictus* Skuse, *Indian Mus. Notes*, 3 : 20 ; Barraud, 1934 : 233 ; Knight and Stone, 1977 : 156 ; Huang, 1977 : 13.

This species has its distribution range in Oriental region, Australian region and parts of Palaearctic and Ethiopian regions. This is the commonest *Aedes* species recorded from almost all over India.

Present records : Manipur : *Chandel* (1,500 m.)—1 ♀ (22 Oct. '85) from forest vegetation, *Chingmeirong* (785 m.)—9 ♂♂, 58 ♀♀ (11 Sept. '83-29 Sept. '83), 18 ♂♂, 28 ♀♀ (28 May '84-13 Sept. '14) were collected during day from human-bait, 23 ♂♂, 70 ♀♀ (18 Sept. '83-4 Dec. '83), 6 ♂♂, 32 ♀♀ (9 Jun. '84-24 Aug. '84) from shrubby vegetation of *Q. acutissima* ; 20 ♂♂, 15 ♀♀ (18 Oct. '83-5 Nov. '83), 79 ♂♂, 69 ♀♀ (17 Jun. '84-26 Aug. '84) were reared from larval collections from Ant-wells inside the grainage house ; 2 ♂♂, 3 ♀♀ (6 Nov. '83) reared from larvae from discarded tar-barrels ; 1 ♀ (8 Nov. '84) reared from larvae from discarded glass container. *Geljang* (850 m.)—1 ♀ (27 Nov. '84) from shrubby vegetation, 6 ♂♂, 4 ♀♀ (27 Nov. '84) reared from larvae from enamel basin inside the grainage house. *Jiribam* (150 m.)—1 ♀ (7 Oct. '84) adult collected from discarded motor tyre ; 23 ♂♂, 14 ♀♀ (7 Oct. '84) reared from larvae from a tree hole ; 6 ♂♂, 3 ♀♀ (7 Oct. '84) reared from larvae from a discarded tar-barrel ; 1 ♂, 5 ♀♀ (7 Oct. '84) reared from larvae from bamboo stumps ; 2 ♀♀ (7 Oct. '84) reared from larvae from discarded motor tyres. *Kalinamei* (1, 500 m.)—1 ♀ (8 Sept. '85) reared from larvae from bamboo-cut. *Khongampat* (785 m.)—1 ♀ (22 Aug. '84) from herb vegetation ; 2 ♂♂, 3 ♀♀ and 1 ♂ (12 Aug. '84) from tree hole and ant-wells respectively. *Koubru-Leikha* (1, 040 m.)—2 ♂♂, 3 ♀♀ (12 Aug. '84) from shrubby vegetation. *Mantripukhri* (784 m.)—1 ♀ (4 Jul. '84) from bulb light, during night, 1 ♀ (11 Jul. '84) from human bait ; 20 ♂♂, 15 ♀♀ (16 Jun. '84—13 Jul. '84) larvae were reared from tree holes ; 22 ♂♂, 26 ♀♀ (21 Jun. '84—14 Aug. '84) from discarded container ; 6 ♂♂, 7 ♀♀ (6 Jul. '84) were reared from bamboo stumps. *Moltam-hill* (820 m.)—1 ♀ (1 Nov. '84) from day biting. *Moreh* (150 m.)—1 ♀ (18 Aug. '84) from human bait collection ; 6 ♂♂, 4 ♀♀ (18 Aug. '84) from biting during day time, 8 ♂♂, 8 ♀♀ (19 Aug. '84) from shrubby vegetation ; 1 ♀ (19 Aug. '84) from human dwellings , 5 ♂♂, 4 ♀♀ (19 Aug. '84) were reared from larval collection from discarded motor tyres. *Nungba* (750 m.)—10 ♂♂, 6 ♀♀ (8 Oct. '84) from day biting ; 17 ♀♀, 15 ♂♂ and 6 ♂♂, 8 ♀♀ (9 Oct. '84) larvae were reared from discarded containers and broken rain gauge with decaying leaves, respectively. *Zaphou* (1,000 m.)—1 ♀ (22 Oct. '85) from human bait. The associative breeders were *Aedes aegypti*, *A. annandalei*, *A. craggi*, *Armigeres subalbatus*, *Culex quinquefasciatus*, *C. brevipalpis* and *C. fuscianus*.

13. *Aedes annandalei* (Theobald)

1910. *Stegomyia annandalei* Theobald, *Rec. Indian Mus.* 4 : 10 ; Barraud, 1934 : 227-229 ; Knight and Stone, 1977 : 157.

The species is mainly Oriental extending its distribution upto New Guinea in

Australian region. In India, it is recorded from Andaman Islands, Assam, Bihar, Maharashtra, Mizoram and West Bengal.

Present records : Manipur : *Jiribam* (150 m.)—2 ♀ ♀ (7 Oct. '84), larvae were reared from a bamboo-stump. *Nungba* (750 m.)—1 ♀ (8 Oct. '84) from shrubby vegetation. The associative breeders were *Aedes albopictus* and *A. craggi*.

14. *Aedes craggi* Barraud

1923. *Aedes craggi* Barraud, *Indian J. Med. Res.* 11 : 227 ; Barraud, 1934 : 229-230 ; Knight and Stone, 1977 : 158.

This species is restricted to India and Thailand only. In India the species has been reported from Assam, Meghalaya and West Bengal.

Present records : Manipur : *Jiribam* (150 m.)—1 ♂ (7 Oct. '84), larva reared from a bamboo-stump. The Associative breeders were *Aedes albopictus* and *A. annandalei*.

15. *Aedes gardnerii imitator* (Leicester)

1908. *Stegomyia gardnerii imitator* Leicester *Stud. Inst. Med. Res. F.M.S.* 3 : 89 ; Mattingly, 1962 : 36 ; Knight and Stone, 1977 : 160.

This has been recorded from China, Hong Kong, India, Kampuchea, Malaysia, Nepal, Taiwan, Thailand and Vietnam. The species has been recorded from Bihar, Manipur and West Bengal in India.

Present records : Manipur : *Nungba* (750 m.)—1 ♂ (8 Oct. '84) landing over human-bait in forest.

16. *Aedes pseudalbopictus* Borel

1928. *Aedes pseudalbopictus* Borel, *Arch. Insts. Pasteur Indochine* : 85 ; Barraud, 1934 : 235-237 ; Huang, 1972 : 28.

This is an Oriental species recorded from Burma, India, Java, Malaysia, Taiwan, Thailand and Vietnam. The species has been recorded from Maharashtra, Manipur and West Bengal.

Present records : Manipur : *Kalinamei* (1,800 m.)—1 ♂ (8 Sept. '85) larva was reared from a bamboo-cut. The associative breeders were *Aedes albolateralis* and *Heizmannia complex*.

17. *Aedes mediopunctatus* (Theobald)

1905(b). *Stegomyia mediopunctatus* Theobald, *J. Bomb. Nat. Hist. Soc.* 16 : 240 ; Barraud : 230-232 ; Knight and Stone, 1977 : 162 ; Huang, 1977, 14(1) : 36-40.

This species has been recorded from India, the Philippines (Palawan) and Sri Lanka. In India, the species has been reported from Assam, Karnataka, Kerala and Maharashtra.

Present records : Manipur : *Nungba* (750 m.)—2 ♀ ♀ (8 Oct. '84) from shrubby vegetation, 6 ♀ ♀ (8 Oct. '84) from human-bait in forest during day. *Tamenglong* (1,200 m.)—1 ♀ (8 Sept. '84) landing for biting in forest.

18. *Aedes andamanensis* Edwards

1922. *Aedes andamanensis* Edwards, *Indian J. Med. Res.* 10 : 272 ; Barraud, 1934 : 290 ; Delfinado, 1967 : 9 ; Knight, 1978 : 34.

The species has a wide range of distribution in Oriental region recorded from Andaman Islands, Assam and Kerala in India.

Present records : Manipur : *Chingmeirong* (785 m.)—5 ♂ ♂, 5 ♀ ♀ (6 Sept. '83—29 Sept. '83), 1 ♀ (27 Jun. '84) were collected from human-bait during day in *Q. acutissima* plantation. 6 ♀ ♀ (20 Oct. '83—4 Dec. '83), 1 ♂ (27 Jul. '84) were collected from shrubby vegetation. *Khongampat* (785 m.)—2 ♂ ♂ (27 Nov. '83), 1 ♀ (16 Dec. '84) from herb vegetation. *Langol-hill* (850 m.)—1 ♂, 1 ♀ (29 Jul. '84) from pit-shelters. *Mantripukhri* (785 m.)—1 ♀ (23 Oct. '83) from human-bait and 1 ♀ (20 Nov. '83), 3 ♂ ♂ (4 Jul. '84—8 Nov. '84) from bulb-light.

19. *Aedes vallistris* Barraud

1928. *Aedes vallistris* Barraud, *Indian J. Med. Res.* 16 : 369 ; Barraud, 1934 : 290-291 ; Knight, 1978 : 38.

The species has been recorded from Burma, India, Kampuchea and Thailand. Earlier known from Assam only in the country.

Present records : Manipur : *Chingmeirong* (785 m.)—3 ♀ ♀ (20 Oct. '83—30 Oct. '83), 4 ♀ ♀ (12 Jul. '84—24 Aug. '84) from shrubby vegetation of *Q. acutissima*. *Mantripukhri* (785 m.)—1 ♀ (23 Oct. '83) from human-bait.

SUMMARY

The communication presents distribution records with ecological notes for the 19 recorded species from the state of Manipur. The recorded species are—*Aedes alboscuteclatus*, *A. caecus*, *A. vexens*, *A. iyengari*, *A. albolateralis*, *A. chrysolineatus*, *A. elisiae*, *A. formosensis*, *A. shortti*, *A. lineatopennis*, *A. aegypti*, *A. albopictus*, *A. annandalei*, *A. craggi*, *A. gardnerii imitator*, *A. pseudalbopictus*, *A. mediopunctatus*, *A. andamanensis*, and *A. vallistris*. The presence of *A. aegypti* and other potential vectors is notable to the public health workers.

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