Variation in Ommatidial Number of Females of *Culex pipiens* complex

Kenji KUROKAWA,[1] Tsutomu ODA,[2] Masakatsu UEDA,[1]
Akio MORI,[1] Osamu SUENAGA,[3] Mariko MINE,[4]
and Yuki ESHITA[5]

Abstract The number of ommatidia in compound eyes of females of *Culex pipiens molestus*, *Cx. p. pipiens*, *Cx. p. pallens*, and *Cx. p. quinquefasciatus* was counted. The ommatidial number varied with the strain, but the females of Japanese strain of *Cx. p. molestus* could be distinguished from those of *Cx. p. pipiens*, *Cx. p. pallens* and *Cx. p. quinquefasciatus* from the difference in ommatidial number.

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Key words : *Culex pipiens* complex, *Culex pipiens molestus*, Ommatidial number, Compound eyes

Introduction

In the previous paper[1], we reported that ommatidial number of compound eyes of the females of *Culex pipiens molestus* differed from that of those of *Culex pipiens pipiens* which belong to the member of the mosquito of *Culex pipiens* complx. This finding may be useful for distinguishing the females of *Cx. p. molestus* and ones of *Cx. p. pipiens*, *Cx. p. pallens*, and *Cx. p. quinquefasciatus*. Therefore, we examined the number of ommatidia in compound eyes of females of various strains of *Culex pipiens* complex obtained from various countries in the world.

1 Department of Medical Zoology, Nagasaki University School of Medicine
2 Department of General Education, the School of Allied Medical Sciences, Nagasaki University
3 Institute of Tropical Medicine, Nagasaki University
4 Scientific Data Center of A-Bomb Disaster, Nagasaki University School of Medicine
5 Department of Parasitology, Teikyo University School of Medicine

Materials and methods

Table 1 shows the outline of the materials. The methods for counting ommatidial number of compound eyes have been previously reported[1].

Table 1. Strains of *Culex pipiens* complex

Strain	Collection site	Date of collection	Generation* in the experiment
Cx. p. molestus			
Tokyo	Tokyo, Japan	February, 1964	F40
Nagasaki	Nagasaki, Japan	November, 1980	F67
Kagoshima	Kagoshima, Japan	October, 1988	F13
Teheran	Teheran, Iran	——	F37
Egypt	Ezbeth-el-Borg, Egypt	1980	F31
Cx. p. pipiens			
Helsinki	Helsinki, Finland	September, 1984	
Leningrad	Leningrad, USSR	September, 1987	
Hamburg	Hamburg, West-Germany	February, 1985	F1
Cx. p. pallens			
Abashiri	Abashiri, Japan	May, 1979	F82
Nagasaki	Aino, Japan	December, 1981	F54
Kagoshima	Kagoshima, Japan	November, 1984	F18
Shanhai	Shanhai, China	September, 1981	F3
Cx. p. quinquefasciatus			
Amami	Nase, Japan	April, 1982	F37
Okinawa	Naha, Japan	March, 1982	F46
Philippine	Manila, Philippine	July, 1983	F57
Thailand	Bangkok, Thailand	September, 1981	
Malaysia	Kuala Lumpur, Malaysia	March, 1986	
Papua New Guinea	Rabaul, Papua New Guinea	June, 1983	F35
Indonesia	Jakarta, Indonesia	June, 1983	F57
Surinam	Paramaribo, Surinam	1979	
Sudan	Khartum, Sudan	1970	

* The generation of mosquitoes reared in the laboratory of Nagasaki University School of Medicine.

Results and discussion

As previously reported, there were 9 ommatidia in all rows in the Helsinki strain in *Cx. p. pipiens*. Most of the females of the Leningrad strain had 9 ommatidia in all rows, but some had 8. In the Hamburg *Cx. p. pipiens*, most of the females had 9 ommatidia, but some had 8 or 10 in the rows, and most of females in Egyptian strain of *Cx. p. molestus* had 8 ommatidia. In this experiment, the remaining females of Egyptian strain were dissected and the results are included in Table 2.

Table 2 shows the distribution frequency of the ommatidial number in compound eyes of *Cx. p. molestus*, *Cx. p. pipiens*, *Cx. p. pallens*, and *Cx. p. quinquefasciatus* females together with data in the previous paper. In *Cx. p. molestus*, most of the females had 8 ommatidia in the 4th to the 6 th rows, but some of them had 9 ommatidia. The rate of females with 9 ommatidia var-

Table 2. Ommatidial number of females of *Culex pipiens* complex

Strain	Row of compound eyes	No females dissected	Ommatidial numbers 8	9	10
Cx. p. molestus					
Tokyo	4	34	32(94.1)	2(5.9)	
	5	34	29(85.3)	5(14.7)	
	6	34	29(85.3)	5(14.7)	
Nagasaki	4	55	55(100.0)		
	5	55	53(96.4)	2(3.6)	
	6	55	55(100.0)		
Kagoshima	4	46	46(100.0)		
	5	46	46(100.0)		
	6	46	46(100.0)		
Teheran	4	59	56(94.9)	3(5.1)	
	5	59	43(72.9)	16(27.1)	
	6	59	52(88.1)	7(11.9)	
Egypt	4	55	41(74.6)	14(25.5)	
	5	55	37(67.3)	18(32.7)	
	6	55	27(49.1)	28(50.9)	
Cx. p. pipiens					
Helsinki	4	30		30(100.0)	
	5	30		30(100.0)	
	6	30		30(100.0)	
Leningrad	4	9	3(33.3)	6(66.7)	
	5	9	2(22.2)	7(77.8)	
	6	9	2(22.2)	7(77.8)	
Hamburg	4	47	10(21.3)	37(78.7)	
	5	47		45(95.8)	2(4.3)
	6	47	3(6.4)	41(87.2)	3(6.4)
Cx. p. pallens					
Abashiri	4	30	1(3.3)	29(96.7)	
	5	30		26(86.7)	4(13.3)
	6	30	1(3.3)	22(73.3)	7(23.3)
Nagasaki	4	76	13(17.1)	63(82.9)	
	5	76		70(92.1)	6(7.9)
	6	76		67(88.2)	9(11.8)
Kagoshima	4	45	10(22.2)	34(75.6)	1(2.2)
	5	45		36(80.0)	9(20.0)
	6	45		25(55.6)	20(44.4)
Shanhai	4	52	11(21.2)	41(78.9)	
	5	52		49(94.2)	3(5.8)
	6	52	2(3.9)	46(88.5)	4(7.7)

( ): % of females

Table 2 (continued)

Strain	Row of compound eyes	No females dissected	Ommatidial numbers		
			8	9	10
Cx. p. quinquefasciatus					
Amami	4	34	13(38.2)	21(61.8)	
	5	34		32(94.1)	2(5.9)
	6	34		30(88.2)	4(11.8)
Okinawa	4	36	4(11.1)	32(88.9)	
	5	36		31(86.1)	5(13.9)
	6	36	1(2.8)	31(86.1)	4(11.1)
Philippine	4	40	6(15.0)	34(85.0)	
	5	40	1(2.5)	37(92.5)	2(5.0)
	6	40		30(75.0)	10(25.0)
Thailand	4	41	17(41.5)	24(58.5)	
	5	41	16(39.0)	25(61.0)	
	6	41	18(43.9)	23(56.1)	
Malaysia	4	40	6(15.0)	34(85.0)	
	5	40	5(12.5)	35(87.5)	
	6	40	5(12.5)	35(87.5)	
Papua New Guinea	4	34	15(44.1)	19(55.9)	
	5	34	11(32.3)	23(67.7)	
	6	34	10(29.4)	24(70.6)	
Indonesia	4	38	21(55.3)	17(44.7)	
	5	38	15(39.5)	23(60.5)	
	6	38	10(26.3)	28(73.7)	
Surinam	4	53	2(3.8)	51(96.2)	
	5	53	3(5.7)	50(94.3)	
	6	53	3(5.7)	50(94.3)	
Sudan	4	50	5(10.0)	45(90.0)	
	5	50	1(2.0)	49(98.0)	
	6	50	2(4.0)	48(96.0)	

( ): % of females

ied with the strain. The Egyptian strain had the highest incidence of females with 9 ommatidia, and variation of the incidence was small in Japanese strain. In *Cx. p. ipiens*, most of the females had 9 ommatidia in the rows, while a few of them had 9 or 10 as mentioned above. The incidences of such females also varied with the strain. This was similar to that of the females in *Cx. p. pallens* and *Cx. p. quinquefasciatus*. It is interesting that the 10 ommatidia females did not appear in the strains of *Cx. p. quinquefasciatus* collected in Thailand, Malaysia, Papua New Guinea, Indonesia, Surinam, and Sudan. In conclusion, the ommatidial number in the females of *Cx. p. molestus* differs

from those of *Cx. p. pipiens*, *Cx. p. pallens*, and *Cx. p. quinquefasciatus*. But the females of Japanese *Cx. p. molestus* and those of the other strains could be discriminated by counting the number of ommatidia, because variation of ommatidial number was small in Japanese *Cx. p. molestus*.

References

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アカイエカ群の雌の個眼数の変異

黒川　憲次[1]　小田　　力[2]　上田　正勝[1]　森　　章夫[1]　末永　敏[3]
三根真理子[4]　江下　優樹[5]

1　長崎大学医学部医動物学教室
2　長崎大学医療技術短期大学部一般教育
3　長崎大学熱帯医学研究所
4　長崎大学医学部付属原爆資料センター
5　帝京大学医学部寄生虫学教室

要　旨　種々の系統のアカイエカ群の雌の個眼数を調べた。チカイエカの個眼数は一般に8個であるが、イランとエジプト系のそれはかなり変異した。日本産のチカイエカでは変異の幅は小さかった。ネッタイイエカ、アカイエカ及びトビイロイエカでは9個の個眼を持ったものが多かったが、8個のものもあった。したがって、日本産チカイエカとその他のアカイエカ群を区別することは可能であろう。

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