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웅성불임기술을 이용한 침파리 구제에 관한연구

——침파리의 인공대량 사육에 관하여(Ⅱ)——

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Study on Stable Fly Eradication by Sterile-Male Technique.

(2) Mass Rearing of the Stable Fly, *Stomoxys calcitrans* L.

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Introduction

Tests have been continued to find the best conditions for rearing stable flies, *Stomoxys calcitrans* (L.), in the laboratory. The flies are being reared under the conditions which we have previously reported as being most favorable for their development (Chung et. al. 1973).

Additional research has been conducted to determine the effects of relative humidity on adult female longevity and to determine the number of eggs laid by an average female fly during her lifetime. The effects of air temperature on the length of each stage of the life cycle of the fly were also studied.

Materials and Method

1) **Rearing of stable adult flies:** Stable adult flies were reared under room condition with temperatures varying from 20°C to 27°C and with relative humidity of 50 to 60% R.H. These were contained in a screened (18 mesh) rectangular cages [3] measuring 40×50×40cms. Each cage contains 1,000 adult flies. For feed, cotton soaked in citrated cattle blood[1] was placed on 9.0 cm dia. petri dish and pad of moisten cotton was hang inside each cage.

2) **Eggs:** For oviposition, a moisten black cloth was attached directly under-neath each cage. The female flies oviposit directly unto this moisten cloth through the screen. The eggs were collected by either washing or brushing them off from the moisten cloth directly into the larval medium or paper and counted.

3) **Larvae:** The CSMA[4] medium (1963) was used as rearing medium. These were contained in plastic containers measuring 23 x 12 x 10 centimeters. The optimum number of larvae to mature to optimum number of pupae cultured on 125 grams of standard medium was also determined.

4) **Pupae:** Complete pupation was observed to occur 10 days after seeding in the rearing medium. The pupae were then separated from the larval medium

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by washing[5,6].

Results and Discussion

1) **Life cycle:** The results of rearing the stable flies under room condition are shown in Table 1. For the period from December 1972 to February 1973 where the mean temperature is 23.7°C, it was observed that it took 16 days to develop from egg to adult, 14 days for preoviposition and 23 days to mature adult. However, for the period from March to April (1973) where the mean temperature is 23.

Table 1. Larval, pupal, preoviposition and adult periods at different temperature condition.

Month	Mean (°C)	Larvae	Pupae	Preoviposition	Days for adult stage
Dec. 1972-Feb. 1973	23.7	7.0	9.2	14.2	23.3
March-April. 1973	23.9	7.2	7.7	12.6	28.7
May-July. 1973	25±1	8.0=	5.3	11.7	30.1

9°C, it took them 15 days from egg to adult,13 days for their preoviposition and 29 days to mature adult stage.

The slightly warmer condition shorten the stages from egg to adult and preoviposition period and lengthens the period to reach a mature adult stage. The effect of warmer temperature is markedly observed for the period from May to July where the mean temperature is 25°±1.0°C.It was observed that it took 13 days to complete the development, and 12 days for preoviposition.

2) **Pupal weight:**

Effect of rearing temperature on pupal weight. To determine the effect of temperature, the pupal weight were determined for the three rearing periods. These results are shown in Table 2.

For mean temperatures of 23.7°C (Dec. 1972 to Feb. 1973)and 23.9°C (Mar.-Apr.) pupal mean weight of 12.4mg and 12.7mg respectively were obtained. However, at rearing temperature of 25±1°C, a heavier pupal mean weight of 13.3mg was obtained indicating that temperature has an effect on the pupal weight.

Table 2. Comparison of the pupal weight grown on the larval medium at different temperature.

Month	Mean Temp. (°C)	Pupal weight (mg)
Dec. 1972-Feb 1973	23.7	12.4
March-April, 1973	23.9	12.7
May-July, 1973	25±1	13.3

3) **Mortality Rate at Preoviposition:**

The long preoviposition of the stable flies are compared to other flies causes some difficulty in obtaining sufficient number of eggs under laboratory conditions. The effect of humidity on mortality rate at preoviposition tsage is shown in Table 3.

Table 3. Mortality during preoviposition due to different humidity.

Relative Humidity(%)	Mean Temp.(°C)	Mortality(%)
65	24.2	13.9
55	23.7	20.9
45	23.9	50

Mortality rate at 65%, 55% and 45% relative humidity were 13.9%, 20.9% and 50% respectively. These results seems to indicate that relative humidity has significant effect on mortality rate and that 65% RH. seems to be the optimum.

4) **Oviposition tendency:**

To determine the oviposition tendency, 900 adult flies were contained in each cage and were observed daily for number of eggs laid. The results of these observations are shown in Table 4.

Table 4. Oviposition tendency of stable fly.

No. of adults	Age of adults(day)	No. of eggs.
913	15	1,091
	17	2,253
	19	2,937
	21	4,486
	23	3,410
	25	3,119

27	1,844
29	1,996
31	997
Total No. of eggs:	22,133

Highest oviposition time was observed from the 7th to 9th day from start of oviposition period or from 21 to 23 days from immergence from pupal stage(Fig. 1).

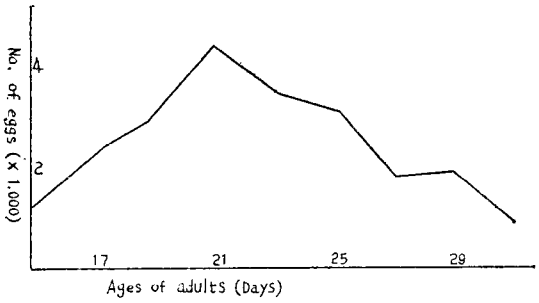

Fig. 1. Oviposition tendency curve of stable fly.

The flies continue to lay eggs for a duration of two weeks. During these period the total number of eggs laid is about 22,000.

Conclusions

The effect of warmer temperature is markedly observed for the period from May to July where the mean temperature is 25°±1.0°C. It was observed that it took 13 days from egg to adult and 12days for preoviposition.

For mean temperatures of 23.7°C and 23.9°C pupal mean weight of 12.4mg and 12.7mg respectively were obtained. However, at rearing temperature of 25±1°C, a heavier pupal mean weight of 13.3mg was obtained indicating that temperature has an effect on the pupal weight.

Relative humidity has significant effect on mortality rate and that 65% R.H. seems to be the optimum.

Each cage of 900 adults (about 450 females) produces about 22,000 eggs during 2 weeks following adult emergence.

초 록

1. 침파리의 동계사육 결과 평균온도 23.7°C에서 유충기간 7일, 용기간 9.2일, 전산란기간(前産卵期間) 14.2일, 성충수명 23.3일 이었다.

2. 5월 부터 7월 까지 사육온도를 25±1°C로 고정시켰을 때의 생육기간은 유충기간 8.0일, 용기간 5.3일, 전산란기간 11.7일, 성충수명 30.1일 이었다.

3. 용(蛹)개체중량은 5월～7월의 25±1°C에서 13.3mg 으로서 현저한 증가를 볼 수 있었다.

4. 전산란기간중의 성충사망율은 습도 조절(R. H.)에 따라서 큰차이를 보여주었으며 누대사육을 위해서는 55～65%의 R. H.를 유지할 필요가 있을 것으로 본다.

5. 성충의 산란율은 산란 시작후 제 8～10일에 제일 높다.

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