

BREEDING OF *MUSCA NEBULO* F.
FOR BIOLOGICAL TESTS OF
INSECTICIDES

BIOLOGICAL tests of insecticides, either for standardisation or a study of reactions, require a pure bred healthy race of insects a continuous supply of which is assured by breeding. Grady¹ bred *Musca Domestica* L. throughout the year and Peet and Grady⁴ used these flies for tests with insecticides. Hockenyos² reared flies for a similar purpose and Musham³ reared *Musca vicina* Coq. The food used was chosen frequently because of its odour being attractive to flies and the adult flies of the required standard were those emerged out of pupæ which were segregated.

Monthly data

Month	Average temperature at 10 A.M. °C.		Average temperature for 24 hours		Total No. of flies available for experiments for the month	Life-cycle days (average)
	Average percentage Humidity		Maximum °C.	Minimum °C.		
June 1947	32	82	32	30	14301	13-19
July "	31	85	31	28	12883	15-23
Aug. "	31	83	29	28	10677	9-15
Sept. "	31	84	29	28	12476	9-14
Oct. "	30	77	30	28	9321	9-13
Nov. "	31	68	31	29	10786	9-13
Dec. "	31	65	29	28	12313	9-15
Jan. 1948	28	68	28	27	12092	9-14
Feb. "	28	69	27	27	8576	9-13
Mar. "	30	68	30	28	9355	9-12
April "	31	74	31	27	8052	9-12
May "	31	74	32	28	10236	8-12
June "	31	78	31	27	16372	8-12
July "	30	85	30	29	13052	8-12

In the course of our studies in this laboratory during the past fourteen months the common Indian housefly *Musca nebulosa* F. was bred continuously, the food adopted for rearing the flies being bran, banana, milk, glucose, vitamins D and E. Dishes with the eggs were kept in a specially designed cage where the entire life-cycle was completed. Adult flies were taken out of the cage and subjected to laboratory tests by means of specially designed apparatus.

The breeding was done entirely under laboratory conditions and the accompanying table shows the number of flies produced as well as other relevant details. The oviposition takes place after the fourth day of emergence and the flies were used for tests on the fifth day.

Breeding took place in the light of an electric lamp. It has been observed that the egg-laying of the insects is affected by the different colours red, yellow and blue.

In tests with suitable insecticides these laboratory bred flies maintained a uniform standard of response under similar conditions. The female fly on an average is more resistant to insecticides than the male fly.

This method of breeding may be found useful in the genetical and cytological studies of these

flies in particular and Diptera in general. Other details of some of our relevant work will be published elsewhere.

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October 2, 1948.

1. Grady, A. G., *J. econ. Ent.*, 1928, 21, 598.
2. Hockenyos, G. L., *Ibid.*, 1941, 24, 717.
3. Musham, B. F., *Bull. ent. Res.*, 1943, 35 (1), 53.
4. Peet, C. H., and Grady, A. G., *J. econ. Ent.*, 1928 21, 617.

CARBOY AS A CHINESE WORD

FOWLER AND FOWLER, in their Concise Oxford Dictionary, refer to carboy as a "large coloured bottle protected with basket-work". It is further mentioned as a modification of the Persian word Qarabah. Hadi Hassan, in his "History of Persian Navigation", indicates contact between Persia and the Far East even earlier than Islam so that a word in Persian could have come through Pehlavi of Pre-Islamic Persia or via Arabic after that period. Either as an Iranian word or as a loan word previously adapted into Pehlavi it could not have incorporated the Arabic sound of Qaf. It is therefore natural to assume that Qarabah was acquired into Persian during its Post-Islamic period.

Just as Indians have made English their literary language Persians then often wrote and spoke in Arabic. Platts in his Urdu English Dictionary also states that Qaraba is a Persian word but one which has been derived from the Arabic root, "Qarb", having the meaning "to be near". I have shown elsewhere that a genuine word is always connotative, whereas, a typical loan word, whose origin is not known, is disposed off as genuine after having been attributed to it a far fetched meaning. That a root meaning "to be near" should give rise to a derivative meaning carboy is like meat to a gymnast in specialised reasoning but like poison to one depending mainly upon one's common sense. Further a Persian derivative has an Arabic root!

A more probable root for deriving Qaraba would have been the Arabic word "Qarba" meaning Massak or Skin as given in *J. Bombay B. R. Asiatic Soc.*, July 1847, p. 355. The word Massack is in common use in India for a leather bag for watering. However, there seems to be an even better explanation.

Giles, in his Chinese English Dictionary, gives character No. 2321 as Ch'iu meaning, among other synonyms, "a Globe". He gives a few terms compounded with it, one meaning "the terrestrial Globe" and another "Spherical". The most striking attribute of a carboy is not that it is made of glass but that it is a large globe. On account of its being placed in a basket its glassy nature is not very evident.

Character No. 7297 is Lo and means "Deep open basket without cover or handles; crate". On looking at a carboy the basket serving as a crate is the more prominent. What we see is only a "Globe placed in a Basket", and precisely

these two features are expressed in a Chinese term for carboy.

A typical basket is always assumed to have a lid or a cover. The word "Lo" expresses an open basket, a Basket which is a crate. The Chinese use a term of two words since one of them alone may not serve its purpose in a monosyllabic language. An ideal synonym for Lo is character No. 9435 or P'o. This word is briefly translated in Mac Gillivray's Dictionary, p. 723, as a Basket-Tray, clearly indicating that the basket is an open one, more like a tray than like a basket with a lid or cover. Lo-P'o then signifies a deep basket which is quite open.

Doolittle, in his English Chinese Dictionary, Vol. I, translates a Great-Globe-of Glass, as To-Po-Li-Chiu, where Chiu is the word for Globe discussed above. The above term of four words cannot designate therein a carboy, for the latter is inseparable from its container, a Basket Crate, which is not expressed therein.

The term Ch'iu-Lo-P'o would appear to be the ideal term for carboy as it signifies a Globe placed in a deep Basket-Crate which is open, more like a tray than like a typical basket. This translation is condensed into Globe-Basket crate-Tray, to represent Ch'iu-Lo-P'o. Now this term in Cantonese is pronounced K'au-Lo-P'o. Like a copyist who thickens the delicate lines of an original drawing foreign sounds get emphasised in a loan word. There is a tendency to reproduce sounds clearer than those in the original; hence the resultant is an exaggeration of subtle syllables. The aspirated K sound has been accentuated into the sound of Qaf which is quite natural to Arabic, so that K' au could become Qau. L is regularly converted into R hence Lo becomes Ro. P'o is a foreign sound to Arabic: F would be nearest to it but its next best conversion into B gives even a clearer sound than F. Cultured Persians speaking Arabic, who probably had to arabicise the term K'au-Lo-P'o, with a developed taste for euphony could not tolerate Qau-Ro-Bo so that the ultimate change gave the more pleasant modification Qa-Ra-Ba with all syllables ending in "A". An attempt to pronounce the last two terms would at once convince how the refined Persian was justified in having taken a little license with the original. Here we may compare the Korean modification of the same term, which is Ku-Ra-P'a. This is even nearer to the Perso-Arabic modification than to the Cantonese term K'au-Lo-P'o. It thus indirectly supports the modification of K' au-Lo-P'o into Qa-Ra-Ba.

Summary.—Carboy is supposed to be derived from Qaraba, which is a Persian word with an Arabic root, meaning "to be near". It is really a loan-word from the Cantonese term K'au-Lo-P'o meaning Globe-Basket crate-Tray. Persians with Arabic culture modified it having taken license for the sake of euphony, into Qa-Ra-Ba or Qaraba. As a loan word from the Chinese, Qaraba appears as a proper connotative word while as a Perso-Arabic word it bears a far fetched meaning.

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BIOLOGICAL CONTROL OF SOME HEMIPTEROUS INSECT PESTS OF CROPS IN INDIA

In India there are several species of insects belonging to the families of Cicindelidæ and Coccinellidæ which are predators. Out of these two families of beetles, Coccinellidæ provides several species which are predaceous on aphids, psyllids and coccids. The insect pests belonging to this group of hemipterous insects cause very serious damage to Agricultural and Horticultural crops throughout India and it is necessary to explore the possibilities of controlling them through indigenous predators which are found in considerable numbers in the fields at the time of insect pest occurrence.

The following predaceous species of coccinellid beetles were collected at Kanpur during 1945-47.

1. *Coccinella septempunctata* L.
2. *Coccinella septempunctata* L. var. *divaricata*-*Ol.*
3. *Coccinella 11 punctata* var. *menetriesii* Muls.
4. *Chilomenes sexmaculata* F.
5. *Chilomenes sexmaculata* F ab *inornata* Ws.
6. *Chilomenes sexmaculata* F ab *rufofasciata*.
7. *Chilomenes sexmaculata* F var. *undulata*.
8. *Brumus saturalis* F.
9. *Verania cardoni* Ws.
10. *Chilocorus nigrinus* F.
11. *Chilocorus circumdatus* F.
12. *Sumnius renardi* Ws.
13. *Sumnius cardoni* Ws.
14. *Scymnus nubilus* Muls.
15. *Scymnus* sp.
16. *Rodolia fumida* Muls.
17. *Rodolia* sp.
18. *Thea cincta* F.
19. *Sticholotis* sp.
20. *Synia melanaria* ab *rougeti* Muls.

Out of the above 20 species collected at Kanpur, the species number 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11 and 14 are very common and are found feeding year after year on aphids, citrus psylla, mango mealy bugs and mango scale. It has been observed that mustard, jowar or maize aphids, citrus psylla, mango mealy bugs and mango scale (*Pulvinaria* sp.) cause serious damage once in every five years or often even more. The population of these insect pests increases in the fields and the natural control is brought about by these beetles to a very great extent.

On the basis of these field observations, experiments were laid out under laboratory conditions to find out the degree of mortality caused by the grubs and adults of the predaceous coccinellid beetles. The following table gives percentage of host insects eaten by one grub and one adult and the maximum fecundity of seven species.

The percentages given are for one grub and one adult for comparison.

It will be observed from the above table that each of these beetles destroys a fairly high percentage of pests. *Sumnius renardi* Ws. destroys a large number of the early stages of mango mealy bugs. In 1946-47 the whole mango tree was covered with the grubs and adults of this beetle and had brought about considerable mor-