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Patterns of Wild Pupae Emergence from 2000-2009 at the Insectary of Departmentvector and Parasitological Studies Nigerian Institute for Trypanosomiasis Research (NITR) Kaduna Nigeria

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Abstracts: To determine the pattern of fly emergence from pupae collected from Suleja out station from 2000-2009 and to provide data base for pupae collection from 2000-2009, Data of pupae collected from Suleja out station at the fly room of Nigerian Institute for Trypanosomiasis Research was consulted from 2000-2009, in which number of fly emergence from pupae brought from the station were recorded based on date of emergence and sex of the fly that emerged. Data on wet bulb, dry bulb, temperature and relative humidity of the fly room were not updated as only data of 2006-2007 were recorded which cannot be use to generalize statement. Results from 2000-2009 a total of 4,331 flies emerged from pupae brought from Suleja out station. Fly emergence rose from 292 flies in 2000 to 784 flies in 2003 and declined drastically to 184 flies in 2006 and rose up to 380 flies in 2008 and declined to 185 flies in 2009, The number of emergence decreased between April and September which corresponded with dry season; by October, the number of emergence started to increase. Conclusions from the findings suggested that Pupae from the field could be obtained between late November and February. At that period, the rate of fly emergence will also be high; this means that for any scientist that requires pupae or tsetse flies for research, these are the best period where flies and pupae can be available.

Key word: Emergence, patterns, pupae, seasonal variation, tsetse flies

INTRODUCTION

Tsetse can be seen as independent individuals in three forms: as third instar larva, as puparia, and as adults. Tsetse's first become separate from their mothers during the third larval instar, during which they have the typical appearance of maggots. However, this life stage is short, lasting at most a few hours, and is almost never observed outside of the laboratory. Tsetse next become puparia which are small, hard shelled oblongs with two distinctive, small, dark lobes at one end. Tsetse puparia are under 1.0 cm long Hoare (1970).

Tsetse then emerge as adult flies. Tsetse adults are relatively large flies, with lengths of 0.5 to 1.5 cm Cockerell (1917), and have a recognizable shape or bauplan so they can usually be distinguished without trouble from other flies. Tsetse has large heads, distinctly separated eyes, and unusual antennae. The tsetse thorax is quite large, while the abdomen is wide rather than elongated and shorter than the wings.

Glossina only occur in Africa where they form a family consisting of a single genus and three subgenera. All these species are potential vectors of various species of trypanosomes and have unusual and similar physiological characteristics Buxton (1955) and Glasgow (1963). Both sexes feed exclusively on blood and take a blood meal every 3 to 4 days Challier (1982). The females mate during the first few days of their life and the sperm stored in the spermathecae lasts for their lifetime. The males remain sexually active throughout life. The females do not lay eggs, but deliver a mature larva (ready to pupate) after a gestation of about ten days. During gestation, the larva is fed on a secretion in the mother's uterus. This larviparity results in a relatively slow reproductive rhythm (one larva about every 9-11 days). The pupal period (25-55 days) is similar for all the species. Specimens of marked *G. palpalis* have been recaptured seven to nine months after being released, which suggests a remarkably long life span, Challier (1973). Since the average life-span of a tsetse fly varies between one and two months depending on the climatic conditions, each female will deliver on average between 3 and 6 larvae during her life. The demographic strategy of tsetse flies is therefore a K-strategy, which is extremely rare for Diptera, this strategy is probably the result of adaptation to competition Jordan (1993) and Barbault (1992).

Technically these insects undergo the standard development process of insects, which comprises oocyte formation, ovulation and fertilization, development of the

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Table 1: total of fly emergence from 2000-2009 at NITR fly room

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
January	0	271	120	190	195	77	59	169	50	7
February	151	129	59	107	102	70	15	66	5	89
March	185	27	74	20	80	31	21	66	2	59
April	43	6	32	3	6	2	1	3	2	30
May	35	0	9	2	6	2	2	8	0	0
June	33	2	15	9	12	22	5	3	0	0
July	56	7	37	41	40	35	23	7	0	0
August	75	11	37	70	55	68	24	1	0	0
September	0	36	66	115	73	60	43	3	0	0
October	116	69	65	101	72	79	68	4	2	0
November	61	50	53	68	86	23	44	0	2	0
December	161	139	70	58	56	150	31	9	317	0
Total	916	747	637	784	783	619	336	339	380	185

egg, five larval stages, a pupal stage, and the emergence and maturation of the adult Jordan (1993).

The negative impact of African animal trypanosomiasis on African agriculture and economy does not need to be stressed here. A series of changing macro- and micro economical factors have induced, over the last decade, major changes in the development policy of donor and developing countries. These include a tendency to favor mixed farming systems (i.e., integrating crops and livestock) and to transfer activities from the public to the private sector. Both existing constraints and changing development policies stress the need to identify priority areas where focused efforts towards integrated disease management will have a maximum impact on the development of those mixed farming systems Guy *et al.* (1999).

Aims and Objectives:

- To determine the pattern of fly emergence from pupae collected from Suleja out station from 2000-2009
- To provide database for pupae collection from 2000-2009.

MATERIALS AND METHODS

Data of pupae collected from Suleja out station at the fly room of Nigerian Institute for Trypanosomiasis Research was consulted from 2000-2009, in which number of fly emergence from pupae brought from the station were recorded based on date of emergence and sex of the fly that emerged. Data on wet bulb, dry bulb, temperature and relative humidity of the fly room were not updated as only data of 2006-2007 were recorded which cannot be used to generalize statement.

RESULTS

From 2000-2009 a total of 4,331 flies emerged from pupae brought from Suleja out station.Fly emergence rose from 292 flies in 2000 to 784 flies in 2003 and declined drastically to 184 flies in 2006 and rose up to 380 flies in 2008 and declined to 185 flies in 2009 as shown in Table 1 and Fig. 1.

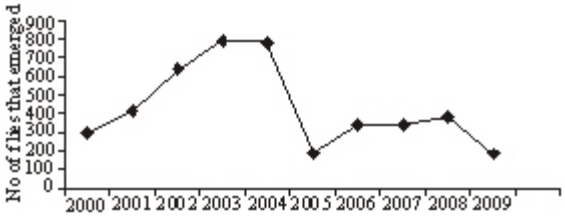

Fig. 1: No of fly emergence from 2000-2009 at NITR fly room

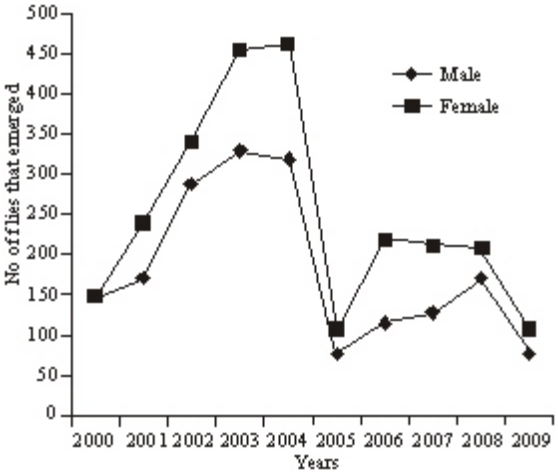

Fig. 2: No of fly emergence based on sex

From the total number of flies that emerged 1,820 were male flies while 2,500 were female flies. 455 female flies emerged in 2003 and 399 were males. The number of females that emerged from 2000-2009 was more than the number of male as seen in Fig. 2.

The Number of emergence by months showed that for the entire period 2000-2009, flies emerged more between Novembers to March. That period matches the availability of pupae in the field and withdrawal of water from most of the riverbanks or streams where tsetse flies lay their pupae. The number of emergence decreased between April and September which corresponded with

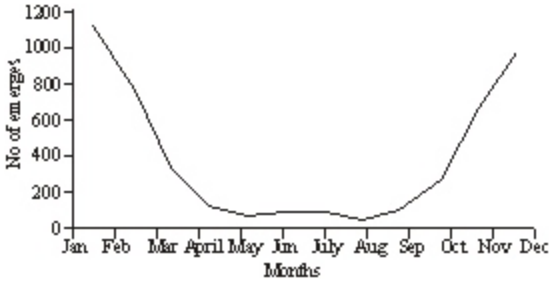

Fig. 3: patterns of fly emergence from January-December

dry season and high amount of rainfall; by October, the number of emergence started to increase as seen in Fig. 3.

DISCUSSION

These results show the pattern of tsetse and pupae availability in the field. Between November and early February the patterns and Number of flies that emerged and the availability of pupae in the field is high at that period because the soil around the river beds, under fallen logs and around sheltered tree bases are not completely dry; they have some little moisture which help the pupae to thrive well. Like wise the relative humidity and temperature of the fly room during that period is minimal and favorable for fly emergence. Between April to late September, the patterns and Number of flies that emerged and availability of pupae in the field is very low which corresponds with dry season where the relative humidity is low and temperature is very high with high amount of rainfall, this finding is similar to the findings of Offor (1984), where he found high emergence of flies during the said period. The higher number of female flies that emerged could probably be associated with females living longer than males and this has been corroborated by some authors Jaenson (1980) and Challier and Gouteur (1981). One of the aspects which has not been covered inthis study is the relationship between temperature, relative humidity and rate of fly emergence in the laboratory; this is due to absence of data in the fly room, another aspect not covered by this research is to differentiate between the different species that emerged, although from available data and other research conducted from 1973 to 1983 *Glossina palpalis palpalis* are the dominant species in Suleja out station, followed by *Glossina logipalpalis* Offor (1984).

CONCLUSION

From the findings above, Pupae from the field can be obtained between late November and February. At that period, the rate of fly emergence will also be high; this means that for any scientist that requires pupae or tsetse flies for research, these are the best period where flies and pupae can be available.

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