

BIBLIOGRAPHY

MAY-OS, MILDRED S. APRIL 2013. Effect of Different Host Plants on the Biology of Cutworm (*Spodoptera litura* Fabricius). Benguet State University. La Trinidad, Benguet.

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ABSTRACT

The study was conducted at the Balili Research Station, Benguet State University, La Trinidad, Benguet from December 2012 to February 2013 purposely to identify which host plants from among the many host plants of cutworm is beneficial on the biology of the insect and eventually utilize the plant for mass rearing under greenhouse condition. The five plants studied for the biology of cutworm were cabbage leaves, camote leaves, castor bean leaves, gabi leaves, and mulberry leaves. The effect of host plants on the insect biology was measured in terms of the duration of development of larva and pupa, size and weight of larva and pupae, percent survival of larva and pupa, percent adult emergence and adult longevity.

The results of the research indicated the excellent development of cutworms reared on castor bean leaves based in all the evaluated parameters in comparison with those reared on cabbage, camote, gabi and mulberry. Observations indicated that the cutworm reared on castor bean had the longest duration of development, had the biggest and heaviest larva and pupa with the highest percentage of survival. Those cutworms reared on castor bean were likewise observed with the highest percentage of adult emergence with the longest life span.



RESULTS AND DISCUSSION

Development Duration of Cutworm

The development duration of cutworm larva and pupa is presented in Table 2. It is presented on the data table, the longest duration of development for those larvae reared on castor bean equivalent to 29.9 days significantly longer than those cutworm reared on cabbage, camote, gabi and mulberry. Larval development of cutworm reared on cabbage was 27.4 days, those reared on camote was 26.8 days, 28.10days on gabi and 27.20 days for those reared on mulberry. The duration of development of larvae reared on cabbage, camote, gabi and mulberry was numerically different but statistically, they were insignificantly different.

Those cutworms reared on castor bean leaves had the longest duration of development of pupa equivalent to 21.4 days significantly longer than those cutworm reared on cabbage, camote, gabi and mulberry. The pupae with the second longest duration of development were those reared on cabbage significantly longer than those reared on gabi, camote and mulberry. The duration of development of those cutworm reared on cabbage was 18.40 days followed by those reared on gabi equivalent to 17.40 days. Those cutworms reared on camote and mulberry had the shortest duration of development equivalent to only 16.4 days and 15.8 days, respectively.



Table 2. Developmental Duration (days) of cutworm as affected by different host plants

TEATMENT	INSECT STAGE	
	LARVA	PUPA
T1-CABBAGE	27.4 b	18.4b
T2-CAMOTE	26.8b	16.4d
T3-CASTOR BEAN	29.9a	21.4a
T4-GABI	28.1b	17.4c
T5-MULBERRY	27.2b	15.8d

Means within each vertical column followed by same letter are not significantly different at 0.05 DMRT

Body Size of Larva and Pupa

The measured size of the larva and pupa is presented in data Table 3. It is clearly presented in the data table the longest body of full grown larvae reared on castor bean equivalent to 43.5 mm significantly longer than those larvae reared on cabbage, camote, gabi and mulberry. Closely second longest in rank were those larvae reared on cabbage, camote, and gabi. The body length of larvae reared on cabbage was 40.1 mm. 39.5 mm on camote and 39.0 mm on gabi. Cutworm larvae with the shortest body length were those larvae reared on mulberry equivalent to 35.3 mm. In terms of the body width, those larvae reared on castor bean had the widest body equivalent to 6.1 mm significantly wider than those larvae reared on cabbage, camote, gabi and mulberry. The body width of the cutworm reared on both cabbage and camote was 4.9 mm, while those reared on gabi was 5.1 mm and 4.4 mm for those reared on mulberry. The body width of larvae reared on cabbage, camote, gabi and mulberry were statistically insignificant.



The body length of the pupa reared on castor bean was the longest equivalent to 20.70 mm significantly longer than those reared on cabbage, camote, gabi and mulberry. Those with the second longest body were those cutworms reared on cabbage equivalent to 18.00 mm insignificantly different with those reared on gabi with the length of 18.40 mm. Closely third were those reared on camote equivalent to 15.00 mm insignificantly different with those reared on mulberry with the body length of 15.70 mm. In terms of width of pupa, the widest were those reared on castor bean equivalent to 5.7 mm significantly wider than those reared on cabbage, camote, gabi and mulberry. Pupae with the second widest body were those reared on gabi equivalent to 5.1 mm insignificantly different with those reared on cabbage equivalent to 4.6 mm. Those reared on camote and mulberry were the smallest equivalent to 4.4 mm and 4.5 mm respectively.

Table 3. Body size (mm) of cutworm as affected by the different host plants

TREATMENT	LARVA		PUPA	
	LENGHT	WIDTH	LENGHT	WIDTH
T1-CABBAGE	40.1 b	4.9 ^b	18.00 ^b	4.6 bc
T2-CAMOTE	39.5 b	4.9 ^b	15.00 ^c	4.4 c
T3-CASTOR BEAN	43.5 a	6.1 ^a	20.70 ^a	5.7 a
T4-GABI	39.00 b	5.1 ^b	18.40 ^b	5.1 b
T5-MULBERRY	35.3 c	4.4 ^b	15.70 ^c	4.5 c

Means within each vertical column followed by same letter are not significantly different at 0.05 DMRT



Body Weight of Larva and Pupa

The weight of larva and pupa are presented in Table 4. The heaviest larvae were recorded on those larvae reared on castor bean equivalent to 1.27 g significantly heavier than those reared on cabbage, camote, gabi and mulberry. Far second heaviest were those reared on both cabbage and gabi with the weight of 0.83 g, while the lightest were those reared on both camote and mulberry equivalent to 0.67 g. As per observation, the larvae reared on castor bean were almost twice bigger than those reared on camote and mulberry.

The heaviest pupae were likewise those reared on castor bean equivalent to 0.40g significantly heavier than those reared on cabbage, camote, gabi and mulberry. The weight of those reared in cabbage, camote and mulberry was 0.26g.

Table 4. Weight (g) of cutworm as affected by the different host plants

TEATMENT	INSECT STAGE	
	LARVA	PUPA
T1-Cabbage	0.83 b	0.26 b
T2-Camote	0.67 c	0.20 b
T3-Castor Bean	1.27 a	0.40 a
T4-Gabi	0.83 b	0.20 b
T5-Mulberry	0.67 c	0.20 b

Means within each vertical column followed by same letter are not significantly different at 0.05 DMRT



Larval Survival (%)

The survival of the larvae as affected by different host plants is presented in data Table 5. The highest percentage of larval survival was the larvae reared on castor bean equivalent to 44.28%. Following closely second were those larvae reared on gabi with the percentage survival of 40.0%, 32.43 % for camote and 33.0% for those reared on mulberry. The larvae reared on cabbage exhibited the smallest percentage of survival equivalent to only 18.45 %.

Table 5. Larval survival (%) as affected by the different host plants

TREATMENT	NO. OF LARVA EMERGED	NO. OF FULL GROWN LARVA	PERCENT (%)
T1-CABBAGE	168	31	18.45 %
T2-CAMOTE	148	48	32.43%
T3-CASTOR BEAN	70	31	44.28%
T4-GABI	100	40	40%
T5-MULBERRY	100	33	33 %

Means within each vertical column followed by same letter are not significantly different at 0.05 DMRT

Survival (%) of Pupa

The survival of the pupa (%) as affected by different host plants is presented in data Table 6. Highest survival of pupa equivalent to 93.54 % was recorded from those reared on castor bean. Far second were those reared on cabbage equivalent to 64.51 % and on gabi equivalent 57.05 %. Far third were those reared on mulberry equivalent to 51.51% and 45.83% for those reared on camote.



Table 6. Survival of pupa (%) as affected by the different host plants

TREATMENT	NO. OF PUPA EMERGED	NO. OF FULL GROWN PUPA	PERCENT (%)
T1-CABBAGE	31	20	64.51%
T2-CAMOTE	48	22	45.83%
T3-CASTOR BEAN	31	29	93.54%
T4-GABI	40	23	57.5%
T5- MULBERRY	33	17	51.51%

Means within each vertical column followed by same letter are not significantly different at 0.05 DMRT

Percent Adult Emergence

The percent adult emergence is presented in Table 7. Highest adult emergence was recorded on those reared on castor bean with the equivalent percentage emergence of 82.75 % closely followed by those reared on cabbage equivalent to 80.0 % and 81.81 % on those reared on camote. Far third were those reared on gabi equivalent to 73.91 % and 76.47 % for those reared on mulberry.

Table 7. Percentage of adult emergence (%) as affected by the different host plants

TREATMENT	NO. OF FULL GROWN PUPA	NO. OF ADULT EMERGED	PERCENTAGE
T1-CABBAGE	20	16	80%
T2-CAMOTE	22	18	81.81%
T3-CASTOR BEAN	29	24	82.75%
T4-GABI	23	17	73.91%
T5- MULBERRY	17	13	76.47%



Means within each vertical column followed by same letter are not significantly different at 0.05 DMRT

Longevity of Adults

The longevity of adult as affected by host plants is presented in Table 8. The longest life spans of the adults were those reared on castor bean equivalent to 7.3 days significantly longer than those reared on cabbage, camote, gabi and mulberry. The life span of the adult reared on cabbage was 5.7 days, 5.4 days on camote and 5.3 days on gabi. Those cutworm reared on mulberry was the shortest equivalent to only 4.3 days.

Table 8. Longevity (days) of adult cutworm as affected by the different host plants

TREATMENT	MEAN
T1-CABBAGE	5.7 b
T2-CAMOTE	5.4 b
T3-CASTOR BEAN	7.3 a
T4-GABI	5.3 b
T5-MULBERRY	4.3 c

Means within each vertical column followed by same letter are not significantly different at 0.05 DMRT



SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary

The study was conducted at the Balili Research Station, Benguet State University, La Trinidad, Benguet from December 2012 to February 2013 purposely to identify which host plants from among the many host plants of cutworm will be beneficial on the biology of the insect and eventually utilize the plant for mass rearing under greenhouse condition. Cutworm has many host plants but in this study, the host plants were narrowed down to only five kinds serving as the treatments namely: cabbage leaves, camote leaves, castor bean leaves, gabi leaves, and mulberry leaves. For a sufficient amount of leaves when needed, before the research was formally started, the different host plants were first propagated. Cabbage and castor bean were propagated on the 7-10 inches diameter clay pots inside the greenhouse at the back of the Diadegma Rearing House. Both camote and gabi were propagated on an area 100 m² consisting of 10 plots each with the size dimension of 1x10 meters.

When propagated plants have borne sufficient amount of leaves for feeding purposes, the mass rearing of cutworm larvae for the study was started. The rearing started with the collection of cutworm egg masses in area at the BSU Research Station planted with cabbages. The collected eggs were immediately placed inside the transparent 1.0 liter capacity beaker and covered with fine mesh cloth. One big egg mass was contained inside the beaker container. Immediately after there were larval emergence, the emerged larvae on the egg masses was counted and offered them the host food leaves contained in firm plastic made cube shaped rearing containers with the size dimension of 5 inches in width, 2 inches in height, and 10 inches in length. Fresh leaves of cabbages, camote, castor bean,



gabi and mulberry which were taken near the shoots were gathered and serve as food for the test insects. The effect of host plants on the insect biology was measured in terms of the duration of development of larva and pupa, size and weight of larva and pupae, percent survival of larva and pupa, (5) percent adult emergence and adult longevity.

The results of the research indicated the excellent development of cutworms reared on castor bean leaves based in all the evaluation parameters in comparison with those reared on cabbage, camote, gabi and mulberry. As per observation, cutworm reared on castor bean had the longest duration of development of both larva and pupa, the biggest and heaviest larva and pupa with the highest percentage of survival. Those cutworms reared on castor bean were likewise observed with the highest percentage of adult emergence. The adult was likewise noted with the longest life span.

Conclusion

It is concluded that the development of cutworm under laboratory condition is best enhanced by the host plant castor bean.

Recommendation

Among the many host plants, the host castor bean is recommended for the mass rearing of cutworm larvae under laboratory condition.



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