Journal of Pharmacognosy and Phytochemistry
Available online at www.phytojournal.com

E-ISSN: 2278-4136
P-ISSN: 2349-8234
JPP 2018; SP1: 18-21

Hem Singh
Department of Entomology, Sardar Vallabhbhai Patel University of Agriculture and Technology. Meerut, UP, India

Ajay Kumar
SKRAU, Bikaner, Rajasthan, India

Anjana
Research Scholar, M.J.P. University, Bareilly, India

Lomash Kumar
Deptt. of Entomology, G.B. Pant University of Agriculture & Tech, Pantnagar, India

Correspondence
Hem Singh
Department of Entomology, Sardar Vallabhbhai Patel University of Agriculture and Technology. Meerut, UP, India

Age specific life table of mulberry silk worm (*Bombyx mori* Linneaus race Nistari) on the different cultivar of mulberry silk

Hem Singh, Ajay Kumar, Anjana and Lomash Kumar

Abstract
Life table studies, viz. age specific and survival of *B. mori* on the two different hosts i.e. S-146 and TR-10 species of mulberry plant (*Murus alba*) under natural condition carried out at Sericulture Research Demonstration and Training unit, Department of Entomology, Sardar Vallabhbhai Patel University of Agriculture & Technology, Meerut during 2016-17 indicate that the insect preferred all the two hosts species out of these S-146 were found most suitable food for the overall growth and development of *B. mori*.

Keywords: Hosts plants, life table, *Bombyx mori*, survival

Introduction
The mulberry silk worm (*Bombyx mori* Linn.) belongs to the order Lepidoptera and family bombicidae reared for production of mulberry type of silk. The industrial and commercial use of silk, the historical and economical importance of production and its application all over the world finally contributed to the silkworm promotion a powerful laboratory for the basic research in biology (Babu *et al.*, 2009). Investigations are directed at new improved methods of silkworm rearing, convention breeding and innovation techniques of silk production. Various studies in the past and present, on silkworm nutrition, have established that is the quality of leaf that ultimately affect the growth and development of silkworm as well as overall silk production (Bajpeyi *et al.*, 1991; Jyothi *et al.*, 2004; Hem Singh,) [2]. The growth rate of the silkworm larvae, *Bombyx mori* L. was accelerated with shortened larval life, increased silkworm output and eggs lying potential of the moth tropical application of ovine prolactin. Significant of prolacting is increasing growth and fecundity of the silkworm was envisaged (Bhaskar *et al.* 1983) [4].
Recently, much research has been done on the diet supplementation of mulberry leaves fed to silkworms. These supplementations include vitamins such as ascorbic acid, thiamin, niacin, folic acid and multi-vitamins (Etebari 2002; Nirwani and Kaliwal 1996, 1998; Saha and Khan 1996; Etebari *et al.* 2004).

Materials and Methods
The studies on various aspects of mulberry sericulture were conducted under laboratory condition at Sericulture Research, Demonstration and Training Unit lab, Department of Entomology, College of Agriculture, S.V.P. University of Agriculture & Technology, Modipuram, Meerut (U.P.) during 2016-17.

Age Specific life table
Observation on number of alive and dead insect out of hundred were recorded daily, the following assumption were used in the construction of age specific life table.
x = Age of the Insect in days.
I_x = Number surviving insects at the beginning of each interval x out of 100.
d_x = Number dying during the age interval x out of 100.
$100q_x$ = Mortality rate at the age interval x.
e_x = Expectation of life or mean life remaining for individuals of age x.
Life expectation was calculated using the equations
$e_x = T_x / l_x$
To obtain e_x two other parameters L_x and T_x were also computed as given below:
L_x = The number of individual alive between age x and x+1 and calculated by the equation.

L_x= l_x +1 (x+1) / 2

T_x= The total number of individual of x age units beyond the age x, and obtained by the equation.

T_x= $l_x + (l_x + 1) + (l_x + 2)\ldots\ldots + l_w$

Where, l_w = the last age interval.

Results and Discussion

1. Mulberry plant species : S-146

The Table-1 and fig-1 indicates that on mulberry species S-146 *B.mori* took 37 days to complete its life cycle. In this case the survivorship declined from the second day and continued decreasing with a number of pauses till 22st day. Thereafter lx remained stable from 23rd to 31th day.

The lx once again start declined from 32nd to 37th day. A sharp declined in lx was observed on 34th and 36th day. The generation was terminated by a reduction of one on 37th day.

In contrast of survivorship, mortality curve followed a pattern with few high and negative low peaks. The highest observed on 34th and 36th day. The generation terminated by the reduction of 1 on 37th day.

A high mortality of 25 and 15 was observed on 34th and 36th day, respectively, while 8 and 11 deaths were encountered on 33ed and 35th day followed by 6 deaths on 15th and 32ed day. A lower mortality of 5, 4 and 3 was seen on 2, 4, 6, 10, 18th and 21st day. Death ranging from 1 to 2 was observed on 3, 14, 22 and 37th day. No mortality was exhibited on the remaining days. The life expectancy period exhibited the similar pattern like of S-1635.

2. Mulberry plant species: TR-10

The table-2 and fig-2. Indicate that on mulberry plant species TR-10 *B. mori* race Nistari took 37 days to complete its life cycle. In case the survivorship declined from the first day and continued decreasing with a number of pauses till 21st day. Thereafter, lx remaining stable from 22ed to 31st day followed by reduction of 8th on 32th day.

The lx remaining stable from 22ed to 31st day. A sharp decline in lx was observed on 33ed and 36th day. The generation was terminated by a reduction of one 37th day.

A high mortality of 13 and 15 was observed on 33ed, 36th and 34th day, respectively, while 8 and 11 deaths were encountered on 32th, and 35th day followed by 7 and 6 death on 3ed and 8th day. A lower mortality of 5, 4 and 3 was seen on 5th, 6th, 11th and 17th day. Death ranging from 1 to 2 was observed on 1, 4, 10, 15, 16, 21 and 37th day. No mortality was exhibited on the remaining days. The life expectancy period exhibited the similar pattern like of S-146.

The data obtained for age specific life table revealed that the age specific survivorship (lx) on both the species of mulberry plants viz.TR-10 and S-146, followed almost the same pattern. There was an initial drop in survivorship followed by an intermittent steady declined with long pauses till the formation adult stage. At adult stage, a sharp decline was recorded on all the four species of mulberry plants till each generation was eliminated. The insect reared on S-146 and TR-10 took the shortest time (37 days) to completes its generation.

Table 1: Age specific life table of *Bombyx mori* Linneaus race Nistari on S-146 variety of mulberry plants

X	lx	dx	100qx	Lx	Tx	ex
0	100	0	0.00	100.00	2708.50	27.08
1	100	0	0.00	100.00	2608.50	26.08
2	100	3	3.00	98.50	2508.50	25.08
3	97	2	2.06	96.00	2410.00	24.84
4	95	5	5.26	92.50	2314.00	24.35
5	90	0	0.00	90.00	2221.50	24.68
6	90	3	3.34	88.50	2131.50	23.68
7	87	0	0.00	87.00	2043.00	23.48
8	87	0	0.00	87.00	1956.00	22.48
9	87	0	0.00	87.00	1869.00	21.48
10	87	4	4.59	85.00	1782.00	20.48
11	83	0	0.00	83.00	1697.00	20.44
12	83	0	0.00	83.00	1614.00	19.44
13	83	0	0.00	83.00	1531.00	18.44
14	83	2	2.40	82.00	1448.00	17.44
15	81	6	7.40	78.00	1366.00	16.86
16	75	0	0.00	75.00	1288.00	17.17
17	75	0	0.00	75.00	1213.00	16.17
18	75	3	4.00	73.50	1138.00	15.17
19	72	0	0.00	72.00	1064.50	14.78
20	72	0	0.00	72.00	992.50	13.78
21	72	4	5.56	70.00	920.50	12.78
22	68	2	3.04	67.00	850.50	12.50
23	66	0	0.00	66.00	783.50	11.87
24	66	0	0.00	66.00	717.50	10.87
25	66	0	0.00	66.00	651.50	9.87
26	66	0	0.00	66.00	585.50	8.87
27	66	0	0.00	66.00	519.50	7.87
28	66	0	0.00	66.00	453.50	6.87
29	66	0	0.00	66.00	387.50	5.87
30	66	0	0.00	66.00	321.50	4.87
31	66	0	0.00	66.00	255.50	3.87
32	66	6	9.09	63.00	189.50	2.87
33	60	8	13.34	56.00	126.50	2.10
34	52	25	48.07	39.50	70.50	1.35
35	27	11	40.74	21.50	31.00	1.14
36	16	15	87.50	9.00	9.50	0.59
37	1	1	100.00	0.50	0.50	0.50

Table 2: Age specific life table of *Bombyx mori* Linneaus race Nistari on TR-10 variety of mulberry plants.

X	Lx	Dx	100qx	Lx	Tx	ex
0	100	0	0.00	100.00	2518.50	25.18
1	100	2	2.00	99.00	2418.50	24.18
2	98	0	0.00	98.00	2319.50	23.66
3	98	7	7.14	94.50	2221.50	22.66
4	91	2	2.19	90.00	2127.00	23.37
5	89	3	3.37	87.50	2037.00	22.88
6	86	4	4.65	84.00	1949.50	22.66
7	82	0	0.00	82.00	1865.50	22.75
8	82	6	7.31	79.00	1783.50	21.75
9	76	0	0.00	76.00	1704.50	22.42
10	76	1	1.31	75.50	1628.50	21.42
11	75	5	6.67	72.50	1553.00	20.70
12	70	0	0.00	70.00	1480.50	21.15
13	70	0	0.00	70.00	1410.50	20.15

14	70	0	0.00	70.00	1340.50	19.15
15	70	1	1.43	69.50	1270.50	18.15
16	69	2	2.89	68.00	1201.00	17.40
17	67	4	5.97	65.00	1133.00	16.91
18	63	0	0.00	63.00	1068.00	16.95
19	63	0	0.00	63.00	1005.00	15.95
20	63	0	0.00	63.00	942.00	14.95
21	61	2	3.27	60.00	879.00	14.41
22	61	0	0.00	61.00	819.00	13.42
23	61	0	0.00	61.00	758.00	12.42
24	61	0	0.00	61.00	697.00	11.42
25	61	0	0.00	61.00	636.00	10.42
26	61	0	0.00	61.00	575.00	9.42
27	61	0	0.00	61.00	514.00	8.42
28	61	0	0.00	61.00	453.00	7.42
29	61	0	0.00	61.00	392.00	6.42
30	61	0	0.00	61.00	331.00	5.42
31	61	0	0.00	61.00	270.00	4.42
32	61	8	13.12	57.00	209.00	3.42
33	53	13	24.53	53.00	152.00	2.86
34	40	15	37.50	46.50	99.00	2.47
35	25	11	44.00	32.50	52.50	2.10
36	14	13	92.00	19.50	20.00	1.42
37	1	1	100.00	0.50	00.05	0.05

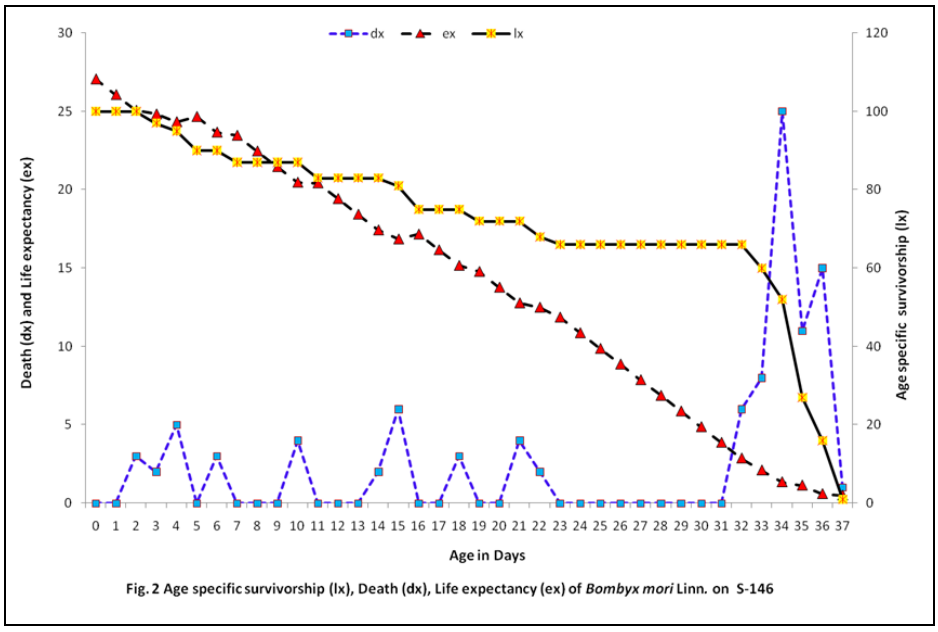

Fig. 2 Age specific survivorship (lx), Death (dx), Life expectancy (ex) of *Bombyx mori* Linn. on S-146

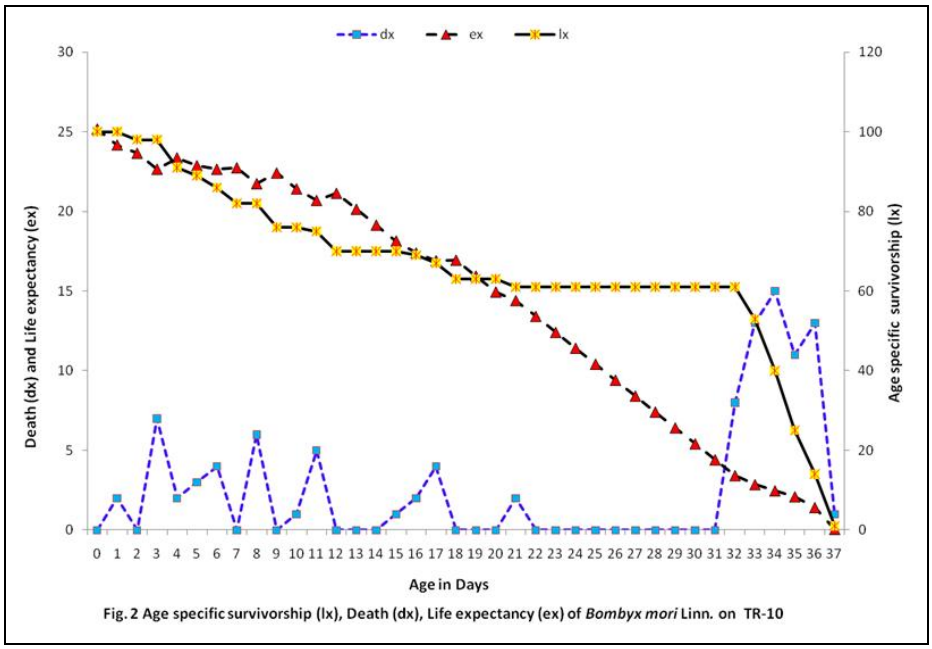

Fig. 2 Age specific survivorship (lx), Death (dx), Life expectancy (ex) of *Bombyx mori* Linn. on TR-10

References

1. Rizvi PQ, Pathak PK. Age specific survival and fertility table of *Spilosoma obliqua* Walker on different food plants, Shashpa. 1998; 5(2):153-158.
2. Bajpai AK, Singh RD. Silk industry of Uttar Pradesh, progress and scope. Published by Regional Development Office, Central silk Board, Govt. of India, 5th Floor, Vikas Deep, Station Road, Lacknow, 1992, 17.
3. Bajpeyi CM, Dubey OP, Ajit Kumar, Jayaswal J. Thangavelu K, Kumar A. Life-table studies of tropical tasar silk worm *Antheraea mylitta* (Lepidoptera: Saturniidae). *Entomon*, 1995; 20(1):59-61.
4. Bhaskar M, Bharathi D, Reddanna P, Govindappa S. Growth pattern of silkworm larvae, *Bombyx mori*, L. on exposure to prolactin. Indian j. Seric. 1983; 11(12):33-35.
5. Debaraj Y, Datta RN, Das PK, Banchamin KV. Eri silkworm crop improvement – A review. Indian J. Seric. 2002; 41(2):100-105.
6. Jethva DM, Vyas HJ. Studies on Life Fecundity Table of *Leucinodes orbonalis* Guenee on Brinjal. Annals of Plant Protection Sciences. 2009; 17(2):64-69.
7. Deevy ESJ. Life-table for natural population of animals. Quarterly Review of Biology. 1947; 22:283-314.
8. Dhandapani N, Kareem AA, Jayaraj S. Life-table studies of *Spodoptera litura* (F) on two varieties of cotton. Journal of Entomological Research. 1989; 13:1-2, 60-63.
9. Golizadeh Ali, Kamali Karim, Fathipour, Yaghoub, Abbasipour Habib. Effect of Temperature on Life Table Parameters of *Plutella Xylostella* (Lepidoptera: Plutellidae) on Two Brassicaceous Host Plants. Journal of Asia-Pacific Entomology. 2009; 12(4):207-212.
10. Hem Singh, Rizvi PQ. Age specific life table of lemon butterfly (*Papilio demoleus* Linn.) on different hosts Under natural conditions. J. Exp. Zool. India. 2007; 10(2):479.
11. Hem Singh, Rizvi PQ. Age specific survival and fertility table of *Papilio demoleus* on different host J. Insect Science. 2007; 20(special):151-152.