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Larval variations of tasar moth, *Antheraea mylitta* drury under control conditions in Champa (C.G.)

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Abstract
The present study depicts the variation in the different larval stages of tasar silkworm *Antheraea mylitta* Drury which is distributed in the form of ecoraces in varied geographical areas. The female moth laid ovoid, spherical or ellipsoidal, slightly flat and bilaterally symmetrical brown coloured eggs in masses. Full fed tasar silkworm larvae is a robust & voracious feeder which measured 122.00 ± 9.63 mm in length, 18.96 ± 0.63 mm in breadth and 25.36 ± 1.63 g in weight. Newly hatched first day larvae measured 15.96±2.46 mm in length, 2.14±0.32 mm in breadth and 0.008±0.002 g in weight under indoor conditions.

Keywords: Kosa, tasar silk moth, rearing, Champa

1. Introduction
Sericulture is a subsidiary occupation in rural India. Tasar silk aka kosa silk is obtained from the tasar silk moth (Insecta: Lepidoptera: Saturniidae). India has a great silk moths biodiversity mainly because of its production of all four types of commercially exploited mulberry and non-mulberry silks viz. Tasar, Muga and Eri. India has the unique distinction of producing all these commercial varieties of silk. Development of Non-mulberry sericulture is of special relevance in the North Eastern states such as Jharkhand, Chhattisgarh, Bihar, Madhya Pradesh, West Bengal, Orissa, Uttar Pradesh, Assam, Jammu and Kashmir and some south states are Andhra Pradesh, Maharashtra, Karnataka and recent observation was also noticed in Kerala suitable the exploitation of vast areas of food plants under natural forests and raised in wastelands can further increase production of tasar, muga and eri. In India both tropical and temperate tasar silkworms are found to occur. In tropical region *Antheraea mylitta* commonly called Indian tasar moth which is a polyphagous species commercially reared on principal food plants of *Shorea robusta* (sal), *Terminalia tomentosa* (Asan) and *Terminalia arjuna* (Arjun). Jolly *et al*. 1968 [4], Agarwal & Seth (1999) [1], Bukhari *et al*. (2019) [3]
Antheraea mylitta Drury (Lepidoptera: Saturniidae) having 44 ecoraces distributed along central India with varied phenotypic, physiological and behavioral characters (Mohanty, 2003, Reddy, 2010) [8]. Some of the eco-races of *Antheraea mylitta* viz., Raily, Modal, Bhandara, Sukinda, Daba, Andhra local are being maintained in different locations in forest area and they lacking behind scientific approach of conservation of these species in natural conditions. Some wild tasar ecoraces like, Raily (Chhattisgarh), Modal and Jata (Orissa), Sarihan and Laria (Jharkhand), Bhandara (Maharashtra) and Andhra (Andhra Pradesh), besides domesticated Daba and Sukinda are contributing for livelihood and alleviating the socio-economic status of around hundred and fifty thousand Indian tribal families (Mohanty 1998).
Champa, city of kosa (silk), kasha (bronze) & kanchan (gold) in Chhattisgarh has the great diversity of flora and many of the plant species serve as host tree of *A. mylitta* under wild conditions. The present study has been designed keeping in view the main objective of measuring the potential of sustainable utilization of the wild silk moth, rearing performance under control indoor conditions

2. Materials and Methods
Initial culture of *A. mylitta* eggs or disease free layings (dfls) were obtained from various farmers from Janjgir-Champa region- 495671 (Chhattisgarh State). The Dfls were washed

properly by 5% Depurotex then dried under eggs dryer machine for 20 mins (Kamraj *et al*. 2017, Vanitha *et al*. 2019) [5] Investigations were carried out to know the biology of tasar silkworm larvae during 2018-19 at Department of Tasar Technology of Govt. M.M.R. P.G. College Champa (C.G.). For indoor rearing of *A. mylitta* newly hatched larvae were released on the leaves of the primary host plant (*T. arjuna & Shorea robusta*) with the help of camel brush having soft bristles to avoid crude shifting (The fresh twigs with 10 to 15 leaves were used as leaf food (Mathur & Shkla, 1998, Babbhaniya *et al*. 2017) [6, 2]. Later instars require medium and mature leaves. A larva was transferred to a new conical flask (Biocraft, Borosilicate glass, 250 ml). Touching with hand to food plants and tasar moth larvae were avoided. The old twigs were replaced by succulent fresh tendered twigs from the conical flask at 12 hours interval. The moulting larvae were transferred along with their support food leaves. The used conical flask was then wash, disinfected and dried for re-use. Egg period was considered as period between date of egg laying and date of egg hatching. In egg observations, the colour, shape and size (breadth and length), were calibrated under stereo trinocular microscope (make: Olympus- SZ 61) fit with brand catcam-130 camera having software power scopephoto (veision.3.1) and weight was recorded on electronic weighing balance as suggested by (Bambhaniya *et al*. 2017) [2]. Moulting was confirmed by the presence of casted off skin of larva of subsequent instars.

3. Results and Discussion

Eggs were found oval, ellipsoidal, slightly flat and bilaterally symmetrical in shape while colour was brown at the time of oviposition. Eggs length, breadth & weight varied from 2.38 to 2.87 mm, 2.15to 2.56mm and 0.005 to 0.015 g with an average of 2.64 ± 0.07 mm, 2.36 ± 0.08 mm & 0.009 ± 0.002 g respectively, under indoor conditions. Similar kind of results was found by (Bambhaniya *et al*. 2017) [2] who recorded the eggs length and breadth 2.68 mm, and 2.34 mm respectively, and the weight of an egg was 0.010 mg.

3.1 First instar: The newly hatched larva was dark brownish or dull yellow in colour (Srivastava *et al*. 2010) Under indoor conditions length, breadth and weight was varied from 13 to 18.09 mm, 1.01 to 2.99 mm and 0.007 to 0.009 g with an average of 15.96 ± 2.46 mm, 2.14 ± 0.32 mm and 0.007 ± 0.001 g, respectively. These findings are in agreement with the findings of (Bambhaniya *et al*. 2017) [2] who observed length, girth and weight of first instar larva as15.96±1.14, 2.16±0.62 and 0.07±0.01 respectively

3.2 Second instar: Under indoor conditions length, breadth and weight was varied from 19 to 29.32 mm, 3 to 6.12 mm and 0.13 to 0.26 g with a mean of 14.32 ± 2.02 mm, 4.05 ± 0.25 mm and 0.16 ± 0.02 g, respectively. Present findings are more or less similar to those reported by Bambhaniya *et al*. (2017) [2] who reported that second instar larvae were 23.24 mm ± 2.15 mm in length, 4.4 ± 0.65 mm in breadth and 0.18 ± 0.03 g in weight.

3.3 Third instar: Body of newly moulted third instar larva was pale greenish in colour and body covered with setae. Under indoor conditions length, breadth and weight was varied in the range of 42 to 56 mm, 10 to 13 mm and 1.39 to 2.40 g with an average of 47.08 ± 4.45 mm, 8.89 ± 5.2 mm and 1.71 ± 0.26 g, respectively. Present finding are more or less similar to those reported by (Bambhaniya *et al*. 2002) who reported that the third instar larvae were 49.08 ± 3.45 mm in length, 10.72 ± 0.60 mm in breadth and 1.91 ± 0.33 g in weight.

3.4 Fourth instar: The body colour of fourth instar larva was pale greenish in colour and body covered with setae. Under indoor conditions length, breadth and weight was varied from 65.00 to 73.00 mm, 15.00 to 17.00 mm and 6.73 to 8.80 g with a mean of 56.23 ± 3.66 mm, 12.35 ± 0.36 mm and 6.82 ± 0.35 g, respectively. Present findings are very much similar with the work done by Bambhaniya *et al*. (2017) [2] who observed that the fourth instar larvae were 66.96 ± 2.99 mm in length, 14.52± 0.59 mm in breadth and 7.87 ± 0.62 g in weight.

3.5 Fifth instar: The body colour of fifth instar larva was greenish in colour and body covered with setae. Under indoor conditions length, breadth and weight was varied from 96.00 to 128.00 mm, 19 to 21 mm and 22.89to 27.34 g with a mean of 122.00 ± 9.63 mm, 18.96 ± 0.63 mm and 24.36 ± 1.63 g, respectively. Present findings are very much similar with the findings Bambhaniya *et al*. (2017) [2] who observed that the fifth instar larvae were 107.72 ± 0.23 mm in length, 19.12± 0.88 mm in breadth and 24.82 ± 1.12 g in weight

4. Conclusion

Non-mulberry production may offer rural population an attractive source of income which may discourage their migratory nature towards urban areas. The importance of these lesser known silk producing insects and their host plant should be studied and explored foe betterment of mankind. It is now essential for our country to promote allied industries related ton sericulture and make complete use of the food plants silkworm for different products

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Table 1: Measurements of various larval stages of tasar silkworm *A. mylitta* under indoor conditions

Different life stages		Measurements	Minimum	Maximum	Mean ± SD
Eggs		Length (mm)	2.38	2.87	2.64 ± 0.07
		Width (mm)	2.15	2.56	2.36 ±0.08
		Weight (g)	0.005	0.015	0.009 ±0.002
Larva	Ist Instar	Length (mm)	13.00	18.09	15.96 ± 2.46
		Width (mm)	1.01	2.99	2.14 ±0.32
		Weight (g)	0.007	0.009	0.008 ±0.002
	IInd Instar	Length (mm)	19.00	29.32	14.32±2.02
		Width (mm)	3.00	6.12	4.05±0.25
		Weight (g)	0.13	0.26	0.16±0.02
	IIIrd instar	Length (mm)	42.00	56.00	47.08±4.45
		Width (mm)	10.00	13.00	8.89±5.2
		Weight (g)	1.39	2.40	1.71±0.26
	IVth Instar	Length (mm)	65.00	73.00	56.23±3.66
		Width (mm)	15.00	17.00	12.35±0.36
		Weight (g)	6.73	8.80	6.82±0.35
	Vth Instar	Length (mm)	96.00	128.00	122±9.63
		Width (mm)	19.00	21.00	18.96±0.63
		Weight (g)	22.89	27.34	24.36±1.63

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