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COMPARATIVE ANALYSIS OF LEAF CHLOROPHYLL AND MOISTURE CONTENT ON PRIMARY AND SECONDARY FOOD PLANT OF TASAR SILKWORM *ANTHERAEA MYLITTA* DRURY

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ABSTRACT

Cocoon crop performance through seasonal rearing of *Antheraea mylitta Drury* depend on the food plant variety and its nutritional status which helps the time bound agricultural works for economic advantage however the leaf production, chlorophyll and moisture content, quantity and season of the plant needs consideration in comparison with primary and secondary host plants for the commercial feasibility. The larva on primary food plants Asan (*Terminalia tomentosa* W & A) and three secondary food plants Ber (*Zizyphusmauritiana*), Sidha (*Lagerstroemia parviflora* Roxb) and Dhauda (*Anoegeissus latifolia* Wall) indicate better performance in winter crop than those of a rainy autumn season. Overall performance was superior in Asan than all other food plants during all the seasons. The gradation of food plants chlorophyll and moisture content with regard to performance (total cocoon production) was in decreasing order of productivity Asan, Ber, Dhauda, Sidha.

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INTRODUCTION

Among silks, the tropical tasar is an important vanya variety produced by a wild silkworm of *A. mylitta* Drury,which is polyphagous and feeds primarily on *Terminalia tomentosa (Asan)* and secondarily on *Zizyphus mauritiana* (Ber), *Lagerstroemia parviflora* (Sidha), *Anoegeissus latifolia (Dhauda).* The leaf nutrition of tasar food plants can enhance the effective rate of rearing (ERR) health and growth of larva and better crop yields as the field quality has direct correlation with cocoon and shell weights silk ratios and silk filaments. The requirements of nutrition quantity and quality are highly specific in sericigenous insects for optimal physiological status and sustainable productivity. The availability of essential nutrients in food plant is vital for successful life cycle, cocoon quality, metamorphosis to moth stage and their productive activity. Studies correlation larval nutrition depend on nutrients status like chlorophyll and moisture contents comparison of primary and secondary host plant.

MATERIALS AND METHODS

At the present work has been chosen to analyze the chlorophyll and moisture content impact of primary and secondary tasar food plants like *Terminalia tomentosa* and *Zizyphus mauritiana*, *Lagerstroemia parviflora*, *Anoegeissus latifolia* rearing of Daba ecorace of tasar silk worm (*Antheraea mylitta Drury*) was carried out during commercial rearing season following the rearing protocol develop by Regional Tasar Research Station (RTRS) Central Silk Board, Baripada, Myurbhanj, Odisha to evaluate the effect of the plant on feeding performance and cocoon characteristics. The observation on different rearing food plants' leaves were collected and brought to PG Department of Botany, North Orissa University, Baripada, Odisha. Then, the collected leaves were evaluated for each primary and secondary food plants of tasar silkworm by standard laboratory techniques and the experiment was repeated yearly from 2011-2015.

RESULTS

The data present in table -1 indicates the moisture content of the selected food plants were determined and presented in *T. tomentosa* showed the maximum percentage of moisture content (61.713±0.33 to 63.264±0.072) followed by *Z.mauritiana* (59.359±0.14 to 62.798±0.75) *L. parviflora* (58.338±2.56 to 62.424±0.42) *A. latifolia* had the minimum moisture content which ranged from 51.443±5.46 to 59.215±6.25 percent.

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Table 1. Comparative account of leaf moisture content of primary and secondary food plants collected in different seasons during study period.

Year	Leaf moisture content (%)			
	T.tomentosa	*A.latifolia*	*Z.mauritiana*	*L.parviflora*
2011	63.128±1.87	57.997±3.73	59.359±0.14	58.338±2.56
2012	62.098±0.16	56.571±4.8	60.93±2.20	58.696±1.20
2013	61.713±0.55	51.443±5.46	60.712±3.18	62.328±0.01
2014	61.835±1.755	55.216±0.045	60.358±1.71	62.424±0.42
2015	63.264±0.072	59.215±6.25	62.798±0.75	59.054±0.14

Table 2. ANOVA (single factor analysis) of leaf moisture content for selected food plants.

SUMMARY				
Group	count	sum	average	variance
T.tomentosa	5	312.038	62.476	#########
A.latifolia	5	280.442	56.0884	#########
Z.mauritiana	5	304.164	60.8328	#########
L.palviflora	5	300.84	60.168	#########

ANOVA						
Source of variation	SS	df	MS	F	P-value	Significance
Between groups	108.7781	3	36.25938	########	########	***
Within groups	60.9475	16	3.809218			
Total	169.7256	19				

Level of Significane:*=p<0.05, **=p<0.01, ***=p<0.001.

Table 3. Comparative account of leaf chlorophyll content of primary and secondary food plants collected in different seasons during study period.

Year	Chlorophyll content (mg/g)			
	T.tomentosa	*A.latifolia*	*Z.mauritiana*	*L.parviflora*
2011	5.899±0.06	7.898±0.25	6.635±0.63	8.342 ±0.63
2012	5.815±0.05	6.912±0.36	6.382±0.45	7.466±0.67
2013	5.947±0.07	7.117±0.51	5.429±0.28	6.686±0.13
2014	5.899±0.05	7.542±0.09	5.544±0.56	6.488±0.58
2015	5.839±0.02	7.301±0.32	6.117±0.68	6.494±0.25

Table 5. ANOVA (single factor analysis) for total leaf chlorophyll content of selected food plants.

SUMMARY						
Groups	count	sum	Average	Variance		
T.tomentosa	5	29.399	5.8798	0.0027792		
A.latifolia	5	36.77	7.354	0.1464055		
Z.mauritiana	5	30.107	6.0214	0.2736313		
L.parviflora	5	35.476	7.0925	0.6473952		
ANOVA						
Source of variation	SS	df	MS	F	P-value	Significance
Between groups	8.33295	3	2.77765	10.381689	0.000491	***
Within groups	4.28.845	16	0.267553			
Total	12.61379	19				

Level of significance:*=P<0.05, **=P<0.01,***=P<0.001

The ANOVA result (Table -2) also showed highly significant variation in leaf moisture content among the food plants (P<0.001) and the average moisture content of the leaves during five years also followed similar trend i.e. maximum in *T.tomentosa* and minimum in *A.latifolia*. The data present in the table 3 & 4 analysis of total chlorophyll content of leaves of selected primary as well as secondary food plants during 2011 to 2015 (table 3) revealed that the total chlorophyll content was maximum in *A.latifolia* (6.912±0.362 to 7.898±0.25 mg/g leaf). The chlorophyll content of *L.parviflora* was estimated to be (6.488±0.58 to 8.342±0.63 mg/g leaf) and in *Z.mauritiana* (5.429±0.28 to 6.635±0.63 mg/g leaf). The minimum chlorophyll content was found in *T.tomentosa* (5.815±0.05 to 5.947±0.07 mg/g leaf). The variation among the food plants with respect to chlorophyll content seemed to be highly significant from ANOVA analysis (Table- 4).

DISCUSSION

The chlorophyll and moisture content of secondary food plants and its nutritional status play a pivotal role for the successful larval rearing resulting to higher cocoons, number of better quality for the commercial sustenance. If such uncertainty factor gets compensated with the low yield on applying the alternate secondary food plants. Though there is no dearth of tasar food plants the accessibility for the utilization makes the tasar rearers to search for alternative. The silkworm reared on different food plant species showed significant difference in their rearing performance. The correlation between silkworm rearing performance and food plant characteristics is well reflected from the experiment. *T.tomentosa* possesses maximum leaf moisture content with minimum chlorophyll content. Among the secondary food plants, *Z.mauritiana* competes *T.tomentosa* followed *by A.latifolia* and *L. parviflora* in both leaf nutritional status, moisture content. However the rearing performance of the silkworm was found negatively correlated to chlorophyll content of leaf of the food plants species. This may be due to certain environmental factors or the age of the leaves selected for chlorophyll estimation. Most of the literatures revealed a positive correlation between the chlorophyll content and rearing performance as chlorophyll directly influences the rate of photosynthesis (Deka and Kumari, 2013; Deka *et al*., 2015).

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