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# Evaluation of Selected Castor Cultivars for their Suitability to Eri Chawki Silkworm Rearing and its Susequent Performance

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**The experiment was conducted during 2012 to 2014 at the Department of Sericulture, University of Agricultural Sciences, GKVK, Bangalore to evaluate the castor cultivars suitable for eri chawki silkworm rearing and its subsequent performance. Eri silkworm(*Samia Cynthia ricini* Boisduval) is a non-mulberry domesticated silkworm belongs to the family Saturnidae of the order Lepidoptera. Eri silk is produced by *Samiacynthiaricini*). Eri silkworm is a polyphagous insect and castor is the preferred host for its rearing. Eri silkworm, *Samia cynthia ricini* Boisduval was reared using eight castor cultivars *viz*., DCH-519, 48-1, DCS-9, GCH-4, DCH-177, GAUCH-1, JC-12 and Bangalore local. The eri silkworms fed on leaves of GAUCH-1 cultivar showed marked variation with respect to larval weight and larval duration of chawki worms. The least total larval duration (21.67days) was noticed in larvae fed with leaves of GAUCH-1. Further, cocoon weight, shell weight, pupal weight, effective rate of rearing (ERR) and silk productivity were also superior in the batches of silkworms fed on leaves of GAUCH-1 cultivar.**

**Keywords:** Eri chawki silkworm, cultivars, rearing parameters.

Eri silkworm(*Samia cynthia ricini* Boisduval) is a non-mulberry domesticated silkworm belongs to the family Saturnidae of the order Lepidoptera. Eri silk is produced by *Samia cynthia ricini*). Eri silkworm is a polyphagous insect and castor is the preferred host for its rearing. India is one of the world principal producers of castor seed. Castor is cultivated in an area of 10.96 lakh ha with seed production of 11.43 lakh tons, besides having the potentiality of producing 12-14 MT/ha of leaf yield. It is proved that about 25 per cent of the total leaf yield can be utilised for Eri cocoon production without affecting the castor seed yield (Devaiah *et al.*, 1981 and Siddiqui *et al.*, 1993*)*. Chawki silkworm rearing is considered as one of the important factors for quality silk production.

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## MATERIALS AND METHODS

The present study was carried out during 2013-14 at Department of Sericulture in collaboration with Departments of Soil Science and Agricultural Chemistry, University of Agricultural Sciences (UAS), Gandhi Krishi Vignana Kendra (GKVK), Bangalore. The castor varieties *viz*., DCS-9, 48-1, JC-12 Bangalore local and hybrids *viz*., DCH-177, GCH-4, DCH-519 and GAUCH-1. The seeds of eight castor cultivars were sown during first week of July during 2013-2014 with spacing of 0.9m X 0.45m and the crop was raised as per the package of practices under rainfed condition (Anon, 2013). Eri silkworm rearing was conducted using white-

plain breed on castor cultivars.. The number of treatments included in this study were eight with three replication. The package of practices followed for eri silkworm rearing was as per Dayashankar (1982).

**Treatment details**

T1- Eri silkworm were fed with leaves of DCH-177
T2- Eri silkworm were fed with leaves of DCH-519
T3- Eri silkworm were fed with leaves of GAUCH-1
T4- Eri silkworm were fed with leaves of GCH-4
T5- Eri silkworm were fed with leaves of DCS-9
T6- Eri silkworm were fed with leaves of JC-12
T7- Eri silkworm were fed with leaves of 48-1
T8- Eri silkworm were fed with leaves of Bangalore local

## EXPERIMENTAL

**Larval Weight**

Eri silkworm fed on leaves of castor cultivars registered significant variation in all the instar except during first instar. The highest larval weight was recorded in the cultivar GAUCH-1 during second, third, fourth and fifth instar (0.061, 0. 387, 0.975 and 6.564 g/larva, respectively) followed by JC-12. The cultivar 48-1 registered next best to GAUCH-1 during fifth instar (5.508 g/larva). However, the least larval weight was recorded in the cultivar DCH-519 during second and third instars (0.030 and 0.203 g/larva), cultivar 48-1 (0.546 g/larva) during fourth instar and in the cultivar Bangalore local (4.22 g/larva) during fifth instar (Table 1).

**Larval Duration**

The eri silkworm nourished with leaves of different castor exhibited significant difference in total larval duration. The duration was significantly shorter in the cultivar GAUCH-1(21.667 days), followed by GAUCH-1 and JC-12 (23.667 days) where as the cultivars GCH-4, DCS-9 and 48-1 recorded the same larval duration of 24.167 days. However, the larval duration was more in the cultivar DCH-519 (24.733 days) (Table 2)

**Economic Traits**

The eri silkworms fed on selected castor cultivars registered a significant variation in the economic traits *viz.*, cocoon weight, shell weight, pupal weight, shell ratio and silk productivity. These traits were highest in the cultivar GAUCH-1 (2.939 g/cocoon, 0.354 g/shell, 2.586 g/pupa, 12.034 % and 5.441 cg/day) respectively. All the traits *viz.*, cocoon weight, shell weight, pupal eight and silk productivity were lowest in the cultivar GCH-4 (2.372 g/cocoon, 0.238 g/shell, 2.134 g/pupa and 3.395 cg/day) respectively. However, the shell ratio recorded was lowest in the cultivar Bangalore local (9.738 %). (Table 3)

**Effective Rate of Rearing (ERR)**

Marked variation was exhibited in ERR when eri worms were fed with selected castor cultivars. The ERR was highest in the cultivar GAUCH-1 (92.500 %) followed by JC-12 (90.633 %). However, the least ERR was recorded in the cultivar GCH-4 (85.633 %) (Table 3).

**Table 1.** Effect of feeding leaves of selected castor cultivars on larval weight of young and late age eri silkworms

| S. No. | Cultivars | Young- age (g/larva) | | Late age (g/larva) | | |
|---|---|---|---|---|---|---|
| | | I Instar | II Instar | III Instar | IV Instar | V Instar |
| 1 | DCH-177 | 0.004 | 0.037 | 0.234 | 0.720 | 5.478 |
| 2 | DCH-519 | 0.004 | 0.030 | 0.203 | 0.718 | 4.300 |
| 3 | GAUCH-1 | 0.005 | 0.061 | 0.387 | 0.975 | 6.504 |
| 4 | GCH-4 | 0.004 | 0.045 | 0.250 | 0.783 | 4.474 |
| 5 | DCS-9 | 0.004 | 0.031 | 0.247 | 0.824 | 4.902 |
| 6 | JC-12 | 0.005 | 0.051 | 0.305 | 0.854 | 5.479 |
| 7 | 48-1 | 0.004 | 0.031 | 0.211 | 0.546 | 5.508 |
| 8 | B-LOCAL | 0.004 | 0.038 | 0.214 | 0.712 | 4.222 |
| F-test | NS | * | * | * | * | |
| S.EM± | 0.001 | 0.003 | 0.009 | 0.014 | 0.098 | |
| CD at 5 % | - | 0.011 | 0.029 | 0.045 | 0.309 | |

## RESULTS AND DISCUSSION

The larval and cocoon parameters, ERR and silk productivity were significantly more when the eri silkworms were fed with leaves of the castor cultivar GAUCH-1.(2.939 g/cocoon, 0.354 g/shell, 2.586 g/pupa, 12.034 %, 5.441 cg/day and 92.500%) respectively. Larval duration was shortest in the cultivar GAUCH-1(21.667days). Larval weight showed positive significant correlation with leaf moisture, crude protein and nitrogen (r= 0.8091, 0.8214 and 0.8215) content in leaves. While, cocoon weight shell weight, pupal weight showed positive significant relationship with leaf moisture, crude protein and mineral matter like nitrogen phosphorous and potassium. The ERR was significantly correlated with phosphorous and potassium (r= 0.7811 and 0.8310). The variations observed might be due to the difference in the biochemical constituents in the leaves of castor cultivars. These results are in conformity with the findings of Basaiah (1988), Patil*et al*. (2000), Jayaramaiah and Sannappa (2000), Ramakrishna Naika*et al*. (2003) who reported differences in the larval weight, larval duration and economic traits when eri silkworm were fed with different castor cultivars.

**Table 2.** Effect of feeding leaves of selected castor cultivars on larval duration of young and late age silkworms

| S. No. | Cultivars | Young- age (Days) | | Late age (days) | | | Total (days) |
|---|---|---|---|---|---|---|---|
| | | I Instar | II Instar | III Instar | IV Instar | V Instar | |
| 1 | DCH-177 | 4.333 | 4.400 | 4.000 | 4.500 | 7.000 | 24.233 |
| 2 | DCH-519 | 4.333 | 4.500 | 4.000 | 4.667 | 7.167 | 24.733 |
| 3 | GAUCH-1 | 3.667 | 4.000 | 3.500 | 4.000 | 6.500 | 21.667 |
| 4 | GCH-4 | 4.333 | 4.333 | 4.000 | 4.500 | 7.000 | 24.167 |
| 5 | DCS-9 | 4.333 | 4.500 | 4.167 | 4.333 | 6.833 | 24.167 |
| 6 | JC-12 | 4.333 | 4.000 | 4.000 | 4.500 | 6.833 | 23.667 |
| 7 | 48-1 | 4.333 | 4.333 | 4.000 | 4.500 | 7.000 | 24.167 |
| 8 | B-LOCAL | 4.500 | 4.500 | 4.000 | 4.500 | 7.000 | 24.500 |
| F-test | NS | * | * | * | NS | * | |
| S.EM± | 0.156 | 0.094 | 0.059 | 0.083 | 0.102 | 0.241 | |
| CD at 5 % | - | 0.309 | 0.193 | 0.274 | - | 0.774 | |

NS: Non Significant B-LOCAL: Bangalore Local *: Significant

**Table 3.** Effect of feeding leaves of selected castor cultivars on cocoon parameters of eri silkworms

| S. No. | Cultivars | Cocoon Weight (g/cocoon) | Shell Weight (g/shell) | Pupal Weight (g/pupa) | Shell Ratio (%) | Effective Rate of Rearing (ERR) (%) | Silk Productivity (cg/day) |
|---|---|---|---|---|---|---|---|
| 1 | DCH-177 | 2.582 | 0.265 | 2.317 | 10.276 | 88.833 | 3.790 |
| 2 | DCH-519 | 2.427 | 0.245 | 2.165 | 10.167 | 86.500 | 3.422 |
| 3 | GAUCH-1 | 2.939 | 0.354 | 2.586 | 12.034 | 92.500 | 5.441 |
| 4 | GCH-4 | 2.372 | 0.238 | 2.134 | 10.023 | 85.633 | 3.395 |
| 5 | DCS-9 | 2.427 | 0.238 | 2.189 | 9.815 | 88.667 | 3.488 |
| 6 | JC-12 | 2.696 | 0.300 | 2.395 | 11.144 | 90.633 | 4.399 |
| 7 | 48-1 | 2.546 | 0.268 | 2.279 | 10.515 | 86.667 | 3.824 |
| 8 | B-LOCAL | 2.517 | 0.245 | 2.260 | 9.738 | 87.633 | 3.500 |
| F-test | * | * | * | * | * | * | |
| S.EM± | 0.024 | 0.004 | 0.026 | 0.202 | 0.588 | 0.078 | |
| CD at 5 % | 0.074 | 0.017 | 0.085 | 0.648 | 1.883 | 0.255 | |

B-LOCAL: Bangalore Local *: Significant

## CONCLUSION

The results of the present study revealed that the cultivar GAUCH-1 can be best exploited for rearing chawkieri silkworms and in turn to rear the late age worms. The cultivar was found promising since it could be used with cost effectiveness for dual purpose of castor seed and eri cocoon production. However, further confirmation is required through repeated experimentation and multi location trails. The present rearing was conducted with plain white eri silkworm breed and the same can be tested for other breeds of eri silkworm.

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