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Development and Evaluation of Silkworm hybrids a review

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Abstract:

The concerted efforts of silkworm breeders contributed significantly for the evaluation and development of new silkworm hybrids suitable to eco-climatic conditions of tropical regions. Continuous renewal and change of existing hybrids with superior varieties and their commercialization is the need of the hour to meet the global demand. With this objective, an attempt has been made at Andhra Pradesh State Sericulture Research and Development Institute (APSSRDI), Hindupur, India and contributed for the development of potential cross breeds. In the present paper, thirty new hybrid combinations were prepared in Line x Tester method involving ten potential polyvoltine breeds with three testers such as APDR115, APS12 and HTO5. The relative merit of the hybrids over multiple traits was assessed by adopting widely used statistical methods such as Evaluation Index and subordinate function methods, the ranks were adjudicated to each of the hybrid combinations. Based on the evaluation methods and performance, five hybrid combinations were adjudicated as promising and chosen for further laboratory evaluation. Subsequently the superior and consistent hybrids would be exploited commercially at farmer level.

Key words: Silkworm, breeding, conventional method, crossbreed, evaluation, commercial exploitation

Introduction

The silkworm, Bombyx mori L. is a lepidopteran economic insect which is known for the production of mulberry silk aptly named as “the Queen of Natural Fibers”. Even though sericulture industry in India has been established as a major source among the agro-based industries, it is still in the process of achieving the required stability since the quality and quantity of silk produced as well as the unit production of silk remains low when compared with sericulturally advanced countries. Enrichment of silkworm breeds / hybrids have always been one of the important factors contributing to increase the productivity in sericulture sector. Continuous development, evaluation, renewal and change of existing breeds/hybrids with new superior varieties and their commercialization is the prime factor to increase silk quality and quantity. Among various reasons for low productivity, the lack of highly productive silkworm

races suitable to environmental conditions prevailing in the Indian sub-continent stands prominent. In addition, Indian sericulture is mostly polyvoltine oriented and the quality of the breeds has deteriorated as a result of continuous and prolonged inbreeding. Thus, breeding emphasizes the need for developing promising genotype of known genetic potential to increase the productivity in plants and animals (Yokoyama, 1956). Hence, silkworm breeds play a vital role in the success of sericulture industry. Thus the breed development and improvement is a continuous process which aims at providing suitable genotypes with desired traits. India has emerged today as the second largest producer of mulberry raw silk besides being producing all the varieties of commercially exploited silks of the world. Such an achievement was made possible as a result of significant breakthrough made in Research and Development in tropical sericulture. However, the bulk of silk production comes from polyvoltine and polyvoltine x bivoltine hybrids, which is largely suited for handloom sector. Enrichment of silkworm breeds has always been one of the important factors contributing to increase the productivity in sericulture. Continuous renewal and change of existing breeds/hybrids with new superior varieties and their commercialization is vital to increase silk quality and quantity. India demands an increasing supply of quality silk, accessible and at affordable prices which is produced in a minimized cost and sustainable way. Therefore, it becomes imperative or essential to develop the breeds that are stable under different environmental conditions. Even though sericulture industry in India has been established as a major source among the agro-based industries, it is still in the process of achieving the required stability. Among various reasons, the lack of highly productive silkworm races suitable to environmental conditions prevailing in the Indian sub-continent stands prominent.

Sericulture in India - Past and present Indian

silk industry has registered a phenomenal growth over the years and presently is accounting for tore than 1 8o/o of the global silk production. India has emerged today as the second largest producer of mulberry raw silk, besides being producing all the five varieties of comrnerciallyexploited silks of the world. Such an achievement was made possible as a result of significantbreakthror.rgh made in Research and Development in tropical sericulture. However, the bulk of silk production comes lrom polyvoltine and polyvoltine x bivoltine hybrids, which is largely serrated for handloom sector. There is an urgent need for production of superior warp quality silk to meetpowerloom requirement and which has to come necessarily from bivoltine

cocoons. Besides, Indian silk industry is suffering from two major constraints i.e., low productivity and high production cost

Bottlenecks in the field of cocoon production have been identified and addressed to a great extent. The new breeds and hybrids, which have been released in the field, are high yielding and hold promise for producing international grade silk. Bivoltine production targets can be increased by providing suitable packages and technical support to more number of farmers. Infect, the " new era"in production of bivoltine has begun with a promise of higher gain for both the primary producers and reefers alike. Needless to mention that, still more is to be done in achieving the target of enlarging the production base of bivoltine in the larger interest of sericulture industry in the country and also to compete in the international market

Sericulture an instrument for employment generation and alleviation of poverty

he new innovations of mulberry cultivation, silkworm rearing and improved hybrid silkworm seeds have brought an unparalleled revolution in the silk industry of the southern states in lndia. They do not call for any special heavy investment as the same are developed to suit the existing socio-economic conditions of the farm house-holds. The simplicity in adoption of these technologies and attractive in cotne thereof have great appeal to the farmers with the result that sericulture is spreading fast in new areas covering practically almost all the districts ofthe southern states. It is also helping in rapid transformation of the poor sericulture villages into reasonably prosperous rural areas. The new sericulture technologies are very much farmer oriented and have in fact, transformed sericulture which used to be a subsidiary rural occupation in the past, into a full time highly remunerative agricultural activity better than any other cash crops. In view of the high employment potential anrdremunerative income generation. sericulture has come to be regarded as one of the irnportant means of alleviating rural poverty and ushering in rural prosperity and is therefore, receiving due attention in rural development programmes both at the State and National levels. In physical terms, the impact of sericulture research on the development of silk industry in the southern states has been very spectacular as evident from the quantum jump in productivity and expansion of the industry.

Importance of silkworm breeds

Silkworm breeds and hybrids play a prominent role in deciding silk output and quality. However, the problems with silkworm breeds have been many and varies in different sericultural regions of the country. In the northern temperate regions, only one razor crop during spring season is

harvested which makes sericulture only as a subsidiary occupation. The farmers by and large in southern tropical regions have reservations about the bivoltine rearing and therefore, the acceptance of bivoltine hybrids on large scale as choice of seed has remained restricted. Besides, the yield potential of earlier bivoltine silkworm breeds and hybrids was low with poor cocoon characteristics (highrenditta and low neatness). These aspects made bivoltine rearing less attractive in the razor silk producing areas of Karnataka, Andhra Pradesh and Tamil Nadu. Added to this, the bivoltine hybrid cocoons have always beset with problems of marketing at remunerative price and thereby till recently it is felt that besides the risk involved, the rearing of bivoltine is not economically viable. On the other hand, the reefers are hesitant to offer a higher price for cocoons because of low price experienced by the reefers which has direct bearing on thee economics of the reeling units. In fact, the private reeling sector has not developed to a stage tosonsume bivoltine cocoons in rational way because offal-re cottage structure.

Conclusion

From the previous results it could be concluded that, most of local double hybrids have superior over the imported one. This may be there were adaptation cause with the local lines for the climatic changes. Although there was acute changing in Egyptian conditions there were some promising double hybrids can be exploitation in commercial scale. So that, the breeding program must be have continuous to create varieties suitable for the fluctuations in climatic conditions.

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