JUST AGRICULTURE
multidisciplinary e-Newsletter

Impact of Apiculture on Pollination and Production of Rapeseed Mustard in Assam

Priyanka Sharma and Monish Roy

ICAR Directorate of Rapeseed Mustard Research, Bharatpur Rajasthan (APART) Sonitpur, Assam

Uttar BangaKrishiVishwavidyalaya, Pundibari, Coochbehar, West Bengal, India

ARTICLE ID: 023

Introduction

Rapeseed mustard is an important group of oilseeds amongst the entire group of oilseeds crops and belongs to the family Brassicaceae. It has also been considered as one of the most dynamic sources of vegetable oils and in terms of production, globally it ranks second-largest oilseed crop after soybean (FAO, 2007). Hence, out of the nine annual oilseed crops (groundnut, rapeseed and mustard, sesame, safflower, sunflower, soybean, niger, castor and linseed) grown in the country, rapeseed and mustard assume significance in the national economy by occupying the second position in area and production next to groundnut. Although Assam being the land of agriculture, it is particularly enriched with diverse agro-climatic conditions and comprised of small and marginal farmers with small-sized landholdings. Since the crops are cultivated mainly in the rain-fed and resource-scarce regions of the state, contributions to livelihood security by the small and marginal farmers in these regions is also very important. Rapeseed mustard is the major source of income for the small and marginal farmers particularly prevailing in the rainfed areas. Based on the current scenario of these small and marginal farmers in addition to agro-climatic conditions of Assam, cultivation of oilseeds crops particularly rapeseed mustard on a large scale is the major source of income in rainfed areas. Because of its low water requirement, rapeseed-mustard crops fit well in the rainfed cropping system. The oilseeds brassicas comprise four species namely *B.campesiris* (B. rape), *B. juncea* (Indian mustard), *B.napus* (winter and spring rape) and *B. carinata* (Ethiopian mustard).

Impact of Rearing Honeybees along with Rapeseed Mustard Cultivation

JUST AGRICULTURE
multidisciplinary e-Newsletter

Since most of the oilseeds crops including rapeseed mustard are cross-pollinated, sufficient pollination is essential for any significant seed production. Cross-pollination of rapeseed mustard by honey bees is considered one of the most effective and cheapest methods for triggering crop yield. It increases the yield of mustard up to 15 to 20 per cent. Among the various pollinating agents, honeybees play a predominant role in increasing the yield of rapeseed since bees and brassica plants build a mutualistic relationship in addition to ensuring an entomophilous mode of pollination. The yield of rapeseed and mustard can be increased through pollination by honeybees. Pollinators not only enhances the yield of the crop but also contribute to uniform and early pod setting. Therefore, planned honeybee pollination could result in increased productivity and improvement in other parameters as well (Abrol, 2007). Both protective applications of pesticides in recommended doses against pests and the use of bees should be integrated in a manner to boost oilseed production and honey production. It would help in increasing the yield and oil content of the state if farmers would start rearing honeybees during the flowering period of rapeseed mustard in their fields which would prove to be an immense source of pollination. Pollination results in an increase in production, improving yield in oil content and even self-compatible crops show enhanced yields when cross-pollinated (Abrol, 2011). Further research and efforts should be undertaken to enhance the productivity of oilseeds crops including rapeseed mustard.

Impact on Rural Development

Beekeeping plays a fundamental role in rural development, by providing income from the sale of honey and other bee products in addition to improving agricultural productivity particularly in terms of improving and increasing oilseeds production. Beekeeping is a highly productive method and appropriates for marginal farmers in many ways since beekeeping does not utilise precious land that could be used for farming activities but it creates a mutual relationship amongst them by cultivating and rearing it together at the same time. Several mustard farmers also keep bee boxes beside their mustard fields during the flowering period to boost yields and collect honey at the same time. The number of honey harvesters is increasing every year in the state as farmers and honey beekeepers have found success in commercial honey farming in mustard fields over the last few years. Cultivation and production of rapeseed mustard in Assam on a large scale coupled with a mass of involvement of rural marginal farmers make beekeeping an essential part of rural

JUST AGRICULTURE
multidisciplinary e-Newsletter

development. Because of the low level of sophistication needed, the beekeeping industry offers direct employment to thousands of people including farmers, landless labourers, hill dwellers and the tribal population. The sustainability of beekeeping is therefore vital to the state's economic well-being and development. Employment and economic conditions of these small and marginal farmers could be enhanced by the initiation of rearing honeybees solely ultimately leading to doubling farmers yield and income which could further be preserved for their upcoming generations.

Case study

This is a story of a beekeeper cum farmer named Nitul Bhuyan of age 38 residing in a small village called Xandohkhuwa in North Lakhimpur district of Assam who has proven to be an inspiration for the other small and marginal farmers of his district as well as the entire state. He started rearing honeybees accidentally while cutting down a tree in his backyard in which the bees died gradually. However, keeping in view its importance of rearing in crop fields, he decided to take help and support from Assam Agricultural University's Regional Agricultural Research Station (RARS), where he learnt how to keep managed honeybee colonies for future utilization. Nitul Bhuyan along with his village people had prepared the beekeeping boxes with locally available woods derived from elephant apple's tree commonly known as 'Outenga' in Assamese. He also used wood from jackfruit trees but it was not found to be suitable for use during monsoons as the bees would not build colonies in jackfruit wood-derived boxes. Woods obtained from mango, neem and silk cotton (Simolu) trees were also being used for the preparation of boxes since it was easily available in his village. In the first year, Bhuyan obtained an approximate yield of 0.5 kg honey but gradually it started increasing to a greater extent and currently villagers of his village have expected to harvest 1000 kg of honey (Fig.1B). Total income would be Rs. 400000 amongst the villagers who got inspired by the farmer cum beekeeper; Nitul Bhuyan. In the year 2020, marginal farmers of his nearby village started borrowing his bees in the form of loans to improve the efficiency of pollination and increase in yield of rapeseed mustard (Fig.1A). The farmers had started adopting this technique in their mustard fields covering an area of 100 bighas during the peak flowering period particularly in December to January. Adoption of scientific-technological interventions in mustard cultivated areas had increased production up to 30%. Apart from increasing the yield of mustard, it also helped in increasing the yields of fruit crops

throughout the year. Hence it can be concluded that beekeeping and Brassicas have a potential relationship in terms of uplifting socio-economic conditions of small and marginal farmers of Assam. Despite facing constraints due to pandemic Covid 19, the effect of country lockdown could not hinder the potential of farmers in production and creation of marketing linkage with the vendors of Xandohkhuwa village in North Lakhimpur district of Assam.

Conclusion

Based on the study of economic conditions of the farmers of Xandohkhuwa village in North Lakhimpur district of Assam, it can be concluded that to increase in yield and to further extend areas into an agricultural sector particularly in the case of rapeseed mustard production, the concept of beekeeping would further consider being a resourceful technique for the marginal farmers prevailing in other parts of the state. Since rapeseed mustard is an entirely self-pollinated plant, hence pollination and fertilization are not meant to be possible unless it is introduced by honeybees. Farmers are further encouraged to initiate the process of beekeeping in mustard fields for doubling their income in addition to bringing awareness among the entire marginal farmers of Assam leading to rural development in the society.