Fungicides Demonstrate High Value for Chickpea Production in Nepal

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Chickpea is the principal source of dietary protein for an estimated 1.8 million Nepalese [1]. The crop also fixes nitrogen in soil and reduces fertilizer costs in subsequent cereal crops like rice and maize. However, the area under chickpea production in Nepal dropped from 54,000 hectares in 1981-82 to only 19,000 hectares in 1997-98. The decrease in chickpea was mainly due to its susceptibility to Botrytis gray mold (Botrytis cinerea) [1]. A Botrytis epidemic in 1997-98 completely destroyed the chickpea crop and virtually eliminated chickpea production from the country. Botrytis not only devastated the crop, but caused serious shortages of seed for the following season [1]. One reason for the widespread damage from Botrytis was that Nepalese farmers had rarely used pesticides [3].

The pathogen attacks all aerial parts of the plant, but the growing tips and flowers are most vulnerable. Affected leaves and flowers turn into a rotting mass [2]. No genotypes with high levels of resistance have been found in extensive screening of chickpea germplasm and breeding lines [2].

In response to the need to manage Botrytis in Nepal, a collaboration was established in 1999 between ICRISAT (International Crops Research Institute for the Semi-Arid Tropics) and NARC (Nepal Agricultural Research Council). Since high levels of Botrytis resistance were not available, Botrytis management with fungicides became the focus of the project [1]. The research demonstrated that seed treatment with fungicides combined with two foliar sprays of a fungicide at 14-day intervals starting from flowering were effective treatments for Botrytis [1]. In addition to fungicide use, the recommended control program included planting cultivars with moderate resistance and agronomic practices such as increased plant spacing. The cost of the fungicides increased the overall cost of growing chickpeas by 13% [4]. However, net returns were 107% higher [1]. Overall, chickpea yields of participating farmers more than doubled. The cost of producing one kilogram of chickpea was reduced by 45% [1].

The Botrytis management program was adopted by 7,000 farmers in the 2001-2002 season and more than 20,000 farmers started growing chickpeas with the program in 2004-2005 [1]. The program was a catalyst to improve the health and livelihoods of poor farmers—it increased family income by 80-100% and increased protein consumption by 40% [1].

References