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PERFORMANCE OF WINTER CROPS IN *JATROPHA CURCAS* BASED INTERCROPPING SYSTEM IN SEMI-ARID REGION OF HARYANA

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SUMMARY

A field experiment was conducted to identify suitable crops for *Jatropha*-based intercropping system during winter season of 2005-06 and 2006-07 at Department of Forestry Farm, CCSHAU, Hisar. The production potential of mustard (*Brassica juncea*) cv. RH-30, *Eruca sativa* cv. T-27, chickpea (*Cicer arietinum*) cv. HC-5 and barley (*Hordeum vulgare*) cv. BH-393 was evaluated under 5 x 3 m spacing of *Jatropha*. *Jatropha* plantation had significant effect on the growth and yield of test crops during both the years of experimentation. However, the growth, yield and yield attributes of all the test crops were reduced more in second year as compared to first year of experimentation. Two year old *Jatropha* produced negligible seed yield both during 2005-06 and 2006-07 due to frost injury in 2005-06 and excessive vegetative growth during 2006-07. Therefore, susceptibility of *Jatropha* to frost, requirement of irrigation for flowering and fruiting and poor seed yield have rendered it unsuitable for north India.

Key words : Winter crops, intercropping, growth, yield, allelopathic effects

India is not self-sufficient in petroleum production and nearly 75 per cent of its requirements are being met through imports. Therefore, there is an urgent need for finding out alternate sources of energy which are renewable, safe and non-polluting. After rigorous study and research, oil extracted from different plant species was tested as fuel which could emerge as a strong bio-fuel with minimum effect on environment. All these characteristics were found in one species, called, *Jatropha*.

Jatropha curcas L. (family Euphorbiace) is a multipurpose large shrub or small tree. It grows on well drained soil with good aeration and is well adapted to marginal soils with low nutrient content. It grows as a boundary fence or live hedge and can be used to reclaim eroded areas (Joker and Jepsen, 2003). Its leaves and stems are toxic to animals. So, it is not browsed, but after treatment, the seed or seed cake can be used as an animal feed. Being rich in nitrogen, the seed cake is also an excellent source of plant nutrients (Makkar *et al.*, 2001).

Agroforestry is a modern tool to develop sustainable land use and to increase food, feed and fodder production by growing woody species (trees, shrubs,

bamboos, etc.) with agricultural crops and/or animals in some form of spatial arrangement or temporal sequence. Because these species co-exist crucial to determine the success of an agroforestry system. A survey of the available information reveals that most of the agroforestry species have negative allelopathic effects on food and fodder crops. Allelopathy and important ecological phenomenon play a significant role in diverse ecosystems. Allelochemicals are the chemicals involved in interplant interactions process diversity in terms of nature and structure. The phenomenon has been reported and agricultural systems are known to be allelopathic. In agroforestry system, the role of allelopathy is especially important as it may lead to soil sickness and may be a casual factor for declining crop productivity reported by Batish *et al.* (2011).

Keeping in view the importance of *Jatropha* oil, *Jatropha* plantation is being promoted by different agencies. It could be intercropped with other crops' plants; however, meagre work has been done in relation to intercropping of food, feed and fodder crops with *Jatropha*. The present study was, therefore, undertaken to find out the suitable summer crops which could be grown with *Jatropha curcas* in interspaces in semi-arid conditions.