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Suitable potato cultivars in non-traditional areas of north-western Rajasthan of India

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Abstract

Studies were conducted during 2015-17 at ICAR-Central Institute for Arid Horticulture, Bikaner in collaboration with ICAR-Central Potato Research Institute, Shimla to find out suitable potato cultivars for processing as well as for table purpose under North Western Rajasthan. Seven potato cultivars (Kufri Khyati, Kufri Garima, Kufri Chipsona-4, Kufri Pukhraj, Kufri Frysona, Kufri Surya and Kufri Jyoti) were raised under sprinkler irrigation as well as drip. Tuber yield varied significantly from variety to variety under both irrigation systems. Under sprinkler irrigation, Kufri Chipsona-4 gave higher yield (53.5 q/ ha) followed by Kufri Frysona (48.00 t/ ha) and Kufri Jyoti (46.5 t/ ha) while minimum yield was observed in Kufri Pukhraj (33.9 t/ ha) and Kufri Khyati (38.8 t/ ha). Kufri Garima and Kufri Surya gave intermediate yields (43.0 and 39.9 t/ ha), respectively. However, under drip irrigation, Kufri Frysona gave higher yield (43.5 t/ ha) followed by Kufri Chipsona-4 (42.9 t/ ha) and Kufri Garima (37.5 t/ ha) and minimum yield was observed in Kufri Pukhraj (20. 0 t/ ha). Kufri Frisona gave higher medium sized tuber yield (14.6 t/ ha) followed by Kufri Surya (11.2 t/ ha) and Kufri Chipsona-4 (9.30 t/ ha) under sprinkler irrigation while, under drip irrigation Kufri Jyoti produced the highest medium sized tuber yield (11.7 t/ ha) as compared to other. Thus, processing varieties Kufri Chipsona-4 and Kufri Frysona were found suitable and proved to possess high dry matter content and were the most efficient varieties in the arid region while for table purpose Kufri Garima and Kufri were found suitable for processing and table purpose, for cultivation in north western Rajasthan

Key words: Arid region, *Bikaner,* gronomic use efficiency, nitrogen, potato, yield, varieties

Introduction

India is the second largest potato producer in the world after China (FAOSTAT 2013). Potato is one of the most important food security crops in the country (Thiele et al. 2010; Singh and Rana 2013) and it plays a vital role in food security for ever increasing world population (Thiele *et al.*, 2010; Scott and Sourez, 2011; Scott and Sourez, 2012). Presently, India is producing about 45-48 million tonnes of potato annually from about 2 million hectare of area The demand for potato has considerably increased during the last decade in India in response to economic development (Singh et al. 2014) and rapid growth of the processing industry (Keijbets 2008; Rana et al. 2010). Actually, 80% of potato is still grown in the Indo-Gangetic Plains in India during *rabi* (winter) season (Minhas et al. 2011) with more than half of the production being concentrated in the states of Uttar Pradesh and West Bengal. At present in India, about 68% of potato production is consumed as fresh while the rest is utilized as seed (8.5%) and processing purposes (7.5%) or the remaining goes as waste (16%) due to various reasons that includes rotting and wastage during the entire potato supply chain (Rana, 2015: Singh *et al.*, 2011, Singh and Rana, 2012 and Singh and Rana, 2013).

In Rajasthan, potato is supplied for consumption from neighbouring states like Punjab and Uttar Pradesh. The cold stored potato in North India, when transported to distant states in the western Rajasthan, undergoes serious quality deterioration. Augmentation of local potato supply is consequently the best way of facing the increase in demand and reducing the consumer price in the western Rajasthan. India aims to produce 125 million tonnes potatoes from 3.6 million hectare area in 2050 for ensuring food security (Singh *et al.* 2014). However, it is possible only if the cultivars of potato are extended to non-traditional areas. Rajasthan in general and Bikaner district in particular are dominated by the hot arid climate. The state in general and the study area in particular are not known for potato cultivation (Rana et al., 2017).

ICAR-CIAH, Bikaner and ICAR-Central Potato Research Institute for past three years have made a systematic effort to introduce potato crop in the *Thar* deserts of Rajasthan by identifying locally adapted suitable varieties, which can produce economic yield under arid region. The south-west part of Rajasthan falls under arid region and known for

Indira Gandhi canal command, western Rajasthan. *Journal of the Indian Society of Soil Science*, 49: 1-6

Duynisveld, WHM, Strebel, O and Bottcher, J .1988. Are nitrate leaching from arable land and nitrate pollution of ground water avoidable. *Ecol.Bull.*, 39: 116-25.

FAOSTAT.2013.FAO, statistical databases FAOSTAT. http://faostat.fao.org/site/567/default.

Hanson, B. R., Schwanki, L. J., Schulbach, K. F. and Pettygove, G. S. 1997. A Comparison of furrow, surface drip and subsurface drip irrigation on lettuce yield and applied water. *Agricultural Water Management*, 33: 139-57.

Holzapfel, E. A., Merino, R., Marino, M. A. and Matta, R. 2000. Water production functions in kiwi. *Irrigation Science*, 19: 739.

Kashyap, P. S. and Panda, R. K. 2002. Effect of irrigation scheduling on potato crop parameters under water stressed conditions. *Agricultural Water Management*, 71:118.

Keijbets, M.J.H. 2008. Potato processing for the consumer: developments and future challenges. *Potato Res.*, 51(3):271-281

Kumar, Satyendra, Asrey, Ram, Mandal, G and Singh Rajbir. 2009.Microsprinkler, drip and furrow irrigation for potato (*Solanum tuberosum*) cultivation in a semi-arid environment *Indian Journal of Agricultural Sciences*, 79 (3): 16-59,.

Minhas, J.S., Rawat, S., Govindakrishnan, P.M., Kumar, D. 2011. Possibilities of enhancing potato production in non-traditional areas. *Potato J.*, 38(1):14-17

Narayanamoorthi, A. 1997. Economic viability of drip irrigation: an empirical analysis from Mahrastra. *Indian Journal of Agricultural Economics*, 52(4): 728-39.

Pawar, D. D., Bhoi, P. G. and Shinde, S. H. 2002. Effect of irrigation methods and fertilizer levels on yield of potato. *Indian Journalof Agricultural Sciences*, 72 (2): 80-83.

Rajesh, K. 2011. The Indian Potato Processing Industry-Global comparison and business prospects. *Outlook on Agriculture (UK)*, 40:237-243

Rana, R.K., Pandit, A., Pandey, N.K. 2010. Demand for processed potato products and processing quality potato tubers in India. *Potato Res.*, 53:181-197

Rana, Rajesh K., Arya, Sushma, Kumar, Sanjay, Singh, Dhir K, Cecilia, T, Mares, V, Quiroz, R. and Kadian, M. S. 2017. SWOT analysis of potato cultivation under arid conditions in western Rajasthan (India) *Indian Journal of Agricultural Sciences*, 87 (12): 168-794.

Scott, G.J. and Suarez, V. 2011. Growth rates for potato in India and their implications for industry. *Potato J.* 36(3-4): 121-35

Sharifi, M., Bernie, J. Z. And Coleman, W. 2007. Screening for nitrogen-use efficiency in potato with a recirculating hydroponic system. Commun Soil Sci Plan, 38: 359-70.

Singh, B. P., Rana, Rajesh K. and Govindakrishnan, P. M. 2014. *Vision 2050*. ICAR-Central Potato Research Institute, Shimla, 26 p.

Singh, B.P. and Rana, R.K. 2013. Potato for food and nutritional security in India. *Indian Farming* 63(7):37-43

Singh, B.P. and Rana, Rajesh K. 2012. Indian potato processing sector: analysis and prospects. In Agriculture Today-Year Book-2012: 58-61

Singh, B.P., Rana, Rajesh K. and Kumar, M. 2011. Technology infusion through contact farming: success story of potato. *Indian Horticulture*, 56:49-51.

Singh, Brajesh, Raigond, Pinky, Joshi, Alka, Mehta, Ashiv and Singh, B.P. 2016. A Manual on Potato Processing in India. CPRI Technical Bulletin No. 48 (Revised).

Spieler, G. 1994. Microsprinklers and microclimates. *International Water and Irrigation Review*, 14 (4): 14-17.

Thiele, G., Theisen, K., Bonierbale, M. and Walker, T. 2010. Targeting the poor and hungry with potato science. *Potato J.*, 37(3-4): 75-86

Trehan, S.P. 2009. Improving nutrient use efficiency by exploiting genetic diversity of potato. *Potato J.* 36(3-4): 121-35