

## Performance of mango based agri-horticultural models under rainfed situation of Western Himalaya, India

Avinash Chandra Rathore · P. L. Saroj · H. Lal · N. K. Sharma · J. Jayaprakash · O. P. Chaturvedi · A. Raizada · J. M. S. Tomar · Pradeep Dogra

Received: 13 February 2013 / Accepted: 27 September 2013 / Published online: 6 October 2013  
© Springer Science+Business Media Dordrecht 2013

**Abstract** A total of 15 years of experimentation period (1995–2010) was divided into two phases. In the first phase (1995–2005), five mango based agri-horticultural models (AHM) viz. Mango + cowpea–toria, mango + cluster bean/okra–toria, mango + sesame–toria, mango + black gram–toria and mango + pigeon pea in addition to sole mango plantation (no intercrop) and in second phase (2005–2010), two mango based AHM (mango + colocasia and mango + turmeric) in addition to sole mango (no intercrop) were studied. The mean maximum cowpea equivalent yield ( $t\ ha^{-1}$ ) was harvested from cowpea (1.84) followed by okra (1.21), black gram (1.11), sesame (0.68) and mean minimum with pigeon pea (0.58). The crop yield reduction among the mango based AHM was observed from third year to tenth year. The positive correlation was found between light transmission and intercrops yields amongst all models

during both phases. However, the correlation between mango canopy spread and intercrop yields shown negative trends. The yield reduction in intercrops varied from 37.0–52.6 % during first phase and 20.6–23.5 % during second phase of experimentation compared to sole crop. The results revealed that the fruit based AHM were effective in improving fruit yields of the mango. The mean maximum fruit yield of mango ( $7.02\ t\ ha^{-1}$ ) was harvested with cowpea–toria crop rotation followed by black gram–toria ( $6.59\ t\ ha^{-1}$ ) and minimum fruit yield ( $5.76\ t\ ha^{-1}$ ) realized with sole mango tree during first phase (1999–2005). Likewise, mean maximum fruit yield ( $13.71\ t\ ha^{-1}$ ) from mango tree was obtained in the turmeric block followed by ( $13.00\ t\ ha^{-1}$ ) in colocasia block and minimum fruit yield with sole mango tree ( $11.86\ t\ ha^{-1}$ ). All the treatments of AHM recorded higher soil moisture as compared to sole mango plantation during both phases. The moisture retention under different AHM was in the order of cowpea