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Effects of Legumes Intercropped in Mango Orchards in the Soconusco, Chiapas, Mexico

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Abstract

Fruit orchards are the principal agricultural crops that generate sustainable economic income to the farmers of the Soconusco Coast, Chiapas. These areas integrate 23000 ha of mango crops cultivated with high chemical inputs, open soil management and flowering stimulation. Outcome of this management is agro-ecological unbalance causing high costs, irregularly yields and requiring quarantine measures for commercial mango orchards in order to prevent infestation with the Mediterranean fly and other fruit flies. In order to alleviate these problems, the principal objectives of this research work were centered around the integration of soil cover with *Crotalaria longirostrata*, *Vigna unguiculata* and *Phaseolus vulgaris* (cv. Escumite) and their effects on fruit development, yield and quality. Since 2005, the effects of different intercropping systems with leguminous crops were integrated in two typical mango fruit regions of the Soconusco. Three leguminous crops i.e. *Crotalaria longirostrata*, *Vigna unguiculata* and *Phaseolus vulgaris* were evaluated as cash and trap crops, The two trials are each 120 × 30 m large and encompass four intercropping management systems (traditional, 3 combinations maize + legumes), laid out in a block design with four repetitions. In each experimental unit, growth and yield parameters of intercropped legumes and their interactions with the yield parameters of the companion fruit trees were determined. The experiments are located in San Felipe (15°16'628'' north latitude, 92°37'479'' west longitude and 128 m.a.s.l.) and in Cintalapa (15°19'431'' north latitude, 92°37'369'' west longitude and 215 m.a.s.l.). The results demonstrate the potential of leguminous crops to improve the ecological stability in traditional fruit orchards. *Crotalaria longirostrata* achieved the highest yield of dry biomass (11.04 t/ha) and the treatment with *Vigna unguiculata* produced 1.03 t/ha. The soil covers integrating leguminous crops increase the soil fertility and benefits insect populations. The mango yield was highest in combination with *Phaseolus vulgaris* (9.13 t/ha) and *Crotalaria longirostrata* (7.42 t/ha). Additionally, more abundance and diversity of insect population was observed when intercropping leguminous crops between the mango trees.

Keywords: Chiapas, fruit orchards, insect population, legumes, mango yield, Soconusco, soil cover