



## **The fate of N, P and ethoprophos in sandy loam soil under red pepper cultivation as affected by different surface management practices**

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A field study was conducted to determine the fate of N, P, and ethoprophos in small scale of red pepper field plots with sandy loam soil and 10% slope, consisting of three different plots with black polyethylene vinyl mulching (mulching), ridge without mulching (ridge), and flat without ridge and mulching (flat). Composted manure at 2 MT ha<sup>-1</sup>, urea at 93 kg N ha<sup>-1</sup> and ethoprophos at 4.5 kg a.i. ha<sup>-1</sup> were treated with basal application. Urea at 189 kg N ha<sup>-1</sup> and inorganic-P at 67 kg P ha<sup>-1</sup> were top-dressed at June 25 using a compound fertilizer (N-P<sub>2</sub>O<sub>5</sub>-K<sub>2</sub>O=21-17-17). Plant uptake of N, P, and ethoprophos was positively correlated with their respective concentrations in surface soil: mulching > ridge > flat plots. The ethoprophos concentration (>1 mg kg<sup>-1</sup>) in surface soil of mulching plot remained high until August 31, which indicated a prolonged degradation due probably to low soil water content in rainy season, compared to ridge and flat plots. On August 31, the inorganic-N concentration highest in the soil depth deeper than 30cm of flat plot, and decreased in the order of ridge plot and mulching plot. In contrast to inorganic-N, ethoprophos was transported deeper in mulching plot on August 31 than in flat and ridge plots. Nitrate loss by runoff was proportional to the volume of runoff water, but phosphate and ethoprophos loss were not proportional. Phosphate loss in this soil associated with high-energy rainfall for detaching from soil matrix, significantly in the ridge plot. The highest loss of ethoprophos also occurred in the ridge plot and initial runoff was almost equal to the total runoff mass. Meanwhile, mulching plot had significant increase of ethoprophos runoff

loss after July 22. This field study suggested that flat plot had high potential of vertical loss, but ridge plot had high runoff potential due to high exposure of ridge surface with high solute concentration in the soil.