STUDY ON NUTRIENT REMOVAL IN BLACK PEPPER (*Piper nigrum* L.) AT DIFFERENT HARVESTING STAGES

A dissertation submitted to the

Faculty of Animal Science and Export Agriculture

Uva Wellassa University

In partial fulfillment of the requirement for the awards of

The Degree of Bachelor of Science in Export Agriculture

By

ERANDI MADUBASHINI KUMARIHAMI DISSANAYAKA

EXPORT AGRICULTURE DEGREE PROGRAM

FACULTY OF ANIMAL SCIENCE AND EXPORT AGRICULTURE

UVA WELLASSA UNIVERSITY OF SRI LANKA

2016

ABSTARCT

The relationship between nutrient removal and harvesting stage of pepper (*Piper nigrum* L.) is poorly understood and such information is important for the soil nutrient management practices especially related to the immature harvesting of pepper. Hence, changes in the status of plant nutrients in pepper berries with four different selected maturity stages (three, five, seven and eight months after flower initiation) were investigated in two cultivars namely, local selection MB-12 and Panniyur-1. Pepper spikes with berries were harvested at above harvesting stages and spikes and berries were separated. Amount of moisture, plant nutrients such as nitrogen (N), phosphorous (P), potassium (K), magnesium (Mg), zinc (Zn), copper (Cu), iron (Fe) and boron (B) were evaluated. Initial nutrient content in index and mature leaves and soil nutrients in the rhizospheres of experimental vines were also evaluated. This study showed a significant difference in nutrient removal in immature (three and four months after flower initiation) and mature (seven and eight months after flower initiation) harvesting. Both MB-12 and Panniyur-1 showed similar pattern of moisture reduction over the maturity. Amount of N removal at mature harvesting of MB-12 and Panniyur-1 were 18.11 and 18.04 kg ha^{-1}, respectively and those values were three fold greater than immature harvesting of the two cultivars. High amount of tissue N (%) determined throughout the berry production indicates the importance of N in berry production. Tissue P (%) in berries became lower with maturity and amount of P removal in mature berries of MB-12 and Panniyur-1 were 1.05 and 1.45 kg ha^{-1} respectively. Potassium removal in mature berries of MB-12 and Panniyur-1 was 10.4 and 12.8 kg ha^{-1}, respectively and those values were three times greater than the immature harvesting. It indicates the need of more K during pepper berry development. Both spikes and berries of the two cultivars had low Mg removal especially at the maturity of eight months: 1.44 and 2.63 kg ha^{-1} in MB-12 and Panniyur-1, respectively. Overall, the study showed N and K are the elements that are needed in large quantities in berry production. Repeated evaluation of these findings and modification of current soil nutrient management practices especially at reproductive stage will be needed to confirm the findings.

Key words: Black pepper, Maturity stage, Nutrient removal, Nutrient management