Comparative Assessment of Vegetable Crop Performances and Ecological Indicators During Transition from Conventional to Ecological Agriculture

L. H. P. Gunaratne[1], K. S. Hemachandra[1] , Y. M. K. Kumudumali[1] , N. K. G. K. R. Manawasinghe[1] , H. G. A. S. Sathischandra[2] , J. M. Soorasena[3] , T. H. M. U. M. Thelasinghe[2] , W. S. P. Y. Upali[3] , W. A. P. Weerakkody[1]* , K. W. L. K. Weerasinghe[1], S. B. A. Weerawarna[2]

[1]Faculty of Agriculture, University of Peradeniya, Peradeniya, Sri Lanka
[2]Agricultural Research Station, Kandakuliya, Kalpitiya, Sri Lanka
[3]Agriculture and Environmental Professionals Cooperative, 2, 1/1 Darmashoka Mawatha, Kandy, Sri Lanka
**Palitha2457@gmail.com*

Selected field vegetable crop combinations and increasing dosage of bio-char application, together with other alternative agronomic components of ecological agriculture (EA) were compared with conventional agriculture (CA) during the first three seasons of transition from CA to EA under hot-humid tropical conditions and sandy regasolic soils in Kalpitiya, Sri Lanka. The recommendations of the Department of Agriculture (Sri Lanka) were followed for managing CA plots while alternative ecological options were followed for plant nutrient and pest managements in EA. Results revealed that Capsicum-beet, Okra-beet and mae-spinach and radish-onion crop combinations could be selected for intercropping under ecological as well as conventional cropping systems based on their yield performances and other yield components. Even though plant growth rates and crop yields were lower at the beginning, EA was able to outrank CA by the third consecutive season. A bio-char amendment of 2 kg m^{-2} could be identified as the best among different dosages tested. Soil N, P and K contents increased along with the advancing seasons while accumulation of heavy metals (i.e. Cd and Hg) were negligible at the end of the third season under EA. Incidence of insect pests and natural enemies were not different between two cropping systems.

Keywords: Bio-char, Ecological Agriculture, Heavy metal pollution, Plant nutrients, Vegetable cultivation