Biodiversity-2013

OMICS Group Conferences
Accelerating Scientific Discovery

2nd International Conference on
Biodiversity & Sustainable Energy Development

August 12-14 2013 Raleigh, North Carolina, USA

# Herbicide banding in *zea mays* – A sustainable weed management solution?

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## Abstract

Services provided by vascular plants to the ecosystem are affected by reductions in floral diversity. Strategies to explore partial restoration of floral biodiversity in cornfields without affecting yields significantly may be worthwhile. Conventional weed management programs in *Zea mays* L. (corn) provide close to complete weed control as a result of broadcast application of broad spectrum residual herbicides. Field experiments at three grower-locations were conducted in West Virginia, USA, in 2010 to 2012, to compare banded and broadcast applications of PRE herbicides. A herbicide pre-mixture containing atrazine, metolachlor, and mesotrione was applied either as broadcast applications or as bands 38 cm wide over corn rows spaced 75 cm apart. While broadcast applications provided the active ingredients at 0.84, 2.24, and 0.224 $kg.ha^{-1}$, banded applications kept the same herbicides at half the application rates per hectare. All treatments were replicated thrice, and were applied prior to weed emergence over 10- to 15-cm corn. At all three locations, corn yields recorded were statistically similar between banded and broadcast applications. Banding herbicides may not only reduce the application rate of herbicides such as atrazine by 50% but may also provide other services to the ecosystem such as reduced soil erosion and nutrient runoff, habitat for beneficial insects and natural enemies, reduced buildup of resistant weed biotypes due to lower selection pressure, and increased levels of floral biodiversity and resultant levels of carbon sequestration. However, buildup of weed seed bank remains to be the primary concern among the scientific and farming communities. This may be addressed by the ability of newer herbicide pre-mixtures to control a broad spectrum of weeds effectively. Herbicides may be band-applied when weed levels have fallen below a certain threshold in cornfields as a result of good weed control. If determined to be a viable practice following further research, this approach may have the potential to provide sustainable solutions to modern cropping systems.