# Effect of Artificial Macropore Installation in Subtropical Soils to Reduce Surface Flow at Sugarcane Field

*Yasushi Mori[1], Kanako Oka[1], Kazutoshi Osawa[2], Akira Hoshikawa[3]

1.Graduate School of Environmental and Life Science, Okayama University, 2.Faculty of Agriculture, Utsunomiya University, 3.Sekisei-shoko Coral Leaf Foundation

Artificial maropores were installed at subtropical red soils to reduce surface flow at sugarcane fields. The fields were suffering from heavy rain which is increasing these days because of climate change. Surface flow causes soil erosion where soil particles were directly delivered into sea with coral leaf. Soil particles would block off the sun and also nutrient rich water damage the coral leaf. Therefore, reducing surface flow with soil particles is crucial for protecting subtropical natural environment. However, conventional sugarcane employs cultivation and fresh planting every year. Agriculture soils are soft with cultivation and fresh planting needs bare soils. In that situation bare soil easily causes surface flow and soil particle loss. Non tillage or reduced tillage are strong countermeasures for those situation, however, agricultural farmers show little appreciation for non-tillage management probably because it seems like uncontrolled or abandoned.
Therefore in this research, we installed artificial macropores into the fields as an option for these situations. Artificial macropores with bamboo fibers were installed 1-m interval for conventional tillage field and non-tillage field. Soil moisture sensors were also installed at 10 and 30-cm deep soil. Rainfall was measured with tipping bucket and surface flow was measured with partial flume.
Results showed that at conventional tillage field, soil moisture sensors at 30cm showed higher water content than 10cm after heavy rain. Surface flow was reduced after macropore installation at tillage field, while non tillage field did not show the descent. These results show that installation of macropore to tillage field reduce the surface flow while enhancing vertical infiltration. However, tubular macropore installation was tedious and time consuming. Here we installed another artificial macropore, namely “linear macropore ”for which macropores were created by subsoiler and fibrous materials were filled to reinforce the structure. The first result with heavy rain showed surface flow was decreasing when compared with bare soil. Its structure was also resistible for clogging when compared with liner macropore without fillings. We are planning to observe field condition next several months to evaluate this technique.

Keywords: artificial macropore, sugarcane, surface flow

 