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Rice farming combined with winter-flooding method has recently been recognized as one of the important environment-preservative farming methods, and its area has been increasing greatly in Japan. However, it is not well reported about yearly change of productivity of this farming method and management practices, especially in comparison with organic farming.

Therefore, we conducted field experiments in Field Science Center, Tohoku University, to investigate productivity of organic rice farming combined with winter-flooding (WOF) in comparison with organic farming without winter-flooding (OF) and conventional farming (CF) over 4 years. Yields of WOF were generally lower than those of CF throughout 4 years but were equal or higher than those of OF, indicating that winter-flooding is one of promising techniques in organic rice farming.

We also examined some management practices in WOF. i) Application of rice bran (0.8 t/ha) just after transplanting was effective for weed control. ii) Repeated mechanical weeding (3 times) in a month after transplanting was also effective to decrease weeds and sometimes increased rice yield. iii) Repeated puddling during 1 month before transplanting did not clearly increase rice yield but significantly increased shoot dry weight and tiller number depending on year. These effects may be caused by enhancement of soil nitrogen mineralization with repeated puddling.

These results indicated that winter-flooding is potentially effective to increase yield in organic rice farming and that yield may be further improved by adopting proper management practices such as repeated puddling.