

## The Influence of Long-term Non-tillage Cultivation on Soil Fertility and Corn Yield on Paddy Field

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### Abstract

The changes of soil fertility and corn yield under long-term non-tillage continuous corn cultivation on paddy field had been studied for 5 years initiated from 1987. The purpose of this study was to compare the effect of non-tillage and conventional tillage of corn on certain chemical and physical properties of the soil and corn yield. A field experiment was initiated in 1987, two crops each year on schist alluvial soil, moderately shallow(>60 cm), imperfect drainage, silt loam (F.C.C.Le) at Taitung. After five years experiment, the soil pH was declined from 7.2 to 6.7 in both tillage and non-tillage treatments, especially, it was lowered by increasing N rates. The soil organic matter content was higher than that was beginning. Available had accumulated from 326Kg/ha to 503 -577Kg/ha. Available CaO and MgO content trended to lower from beginning under both tillage treatments. The change of soil bulk density in both treatments were the same as beginning.

Corn yield of the first crop (Spring corn) from non-tillage increased by 14% as comparison to conventional tillage in 1987, while afterward higher in conventional tillage. Most of seasonal crops, the yields seemed to decrease due to continuous cultivation except fall/winter crop in 1989 and 1990 and spring crop in 1991.

Corn yields in fall/winter crop of 1989 and 1990 and spring crop of 1991 had risen to 6 t/ha due to reasonable irrigation under arid condition which were higher in non-tillage treatments. The effects of nitrogen rates on corn yields were diverse from years and cropping seasons. According to the result obtained from this experiment, it is suggested that 120~180Kg N/ha was better for conventional tillage treatment in spring, fall and fall/winter corn, and 180~240 Kg N/ha was better for non-tillage treatment in spring corn. In generally, 180 Kg N/ha was reasonable for corn yields in all seasons.

**Key words :** Corn, Tillage, Non-tillage, Soil fertility, Nitrogen effect.

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