Changes in Temperature, Cultivation Timing and Grain Quality of Rice in Taiwan in Recent Years

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ABSTRACT

Since the introduction of japonica type rice in the 1920s, Taiwan has become the lowest latitude region that japonica type rice cultivars are dominantly cultivated. There are two rice cropping seasons annually in Taiwan, and temperature of these two seasons is higher than those of temperate countries such as Japan. With the concern of global warming trend, changes in temperature and grain quality in the major rice production zones of Taiwan were analyzed in this study. Results from database analysis indicated that temperature of the major rice production zones has increased in recent years (2000-2008), relative to the time period from 1990 to 1999. The increases of temperature were especially evident during grain filling stage in both crops. As for grain quality, generally the rate of immature chalky grains was higher in the 1st crop than that in the 2nd crop and might be attributed to the higher temperature during the grain filling of the 1st crop. Results further showed that cultivation timing has been shifted in recent years. Transplanting date has been moved forward in the 1st crop while was delayed in the 2nd crop in the major production zones, implying that farmers might have acknowledged the climate change and did it to adapt to global warming. The potential effects of the current warming trend on rice yield and quality traits are also discussed in the context.

Key words: High temperature, Heat, Rice, Yield, Quality, Taiwan.

臺灣近年來溫度、稻作栽培時序及稻米品質之變化

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摘要

氣候變遷可能會顯著影響我國稻作之產量與品質。自1920年代粳型水稻積極引入之

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後，臺灣便成為國際粳型水稻栽培緯度最低的地區。目前臺灣一年有兩個水稻栽培期，與日本等溫帶地區比較，兩個栽培期處於較高氣溫與較低日射量的環境。過去關於臺灣的氣候變遷研究多著重於長期的趨勢回顧或預測，尚無研究報告回顧近年來我國稻米產量與品質的變化趨勢。本報告利用氣象及農政單位的多年期紀錄與調查資料，分析了近年來臺灣稻米主要栽培區的溫度及米質變化。結果顯示，2000-2008年期間主要栽培區的溫度比起前10年期(即1990- 1999年)呈現上升的趨勢；近9年來二月份溫度普遍上升，值得特別注意的是一期作及二期作的穀粒充實期間都出現了溫度升高現象。稻米品質方面，資料分析顯示一期作之未熟白堊質粒比率普遍高於二期作，且近年來米質呈現不穩定的現象。由多年期農民的栽培時序分析發現，一期作及二期作插秧分別有提前及延後之現象，顯示農民在田間的栽培管理也可能因氣候的改變做了調整。由於溫度上升趨勢所造成的其他潛在影響，包括產量及品質性狀，將在本文中一併討論。

關鍵詞： 高溫、溫熱、稻米、產量、品質、臺灣。