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SHORT COMMUNICATION

TWO SEMIDWARFNESS GENES INDUCED FROM *JAPONICA* RICE, CHIANUNG 242 AND TAINAN 5[(1)(2)]

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The Induction of semidwarf mutant CN242-d_3 from *japonica* rice Chianung 242 by ethylmethanesulfonate (EMS) was previously reported by Woo *et al.* (1969). This paper reports the genetics of this mutant, plus other findings of the semidwarfness with erectoid growth habit.

The F_2 generation derived from mutant CN242-d_3 and its parental variety Chianung 242 revealed that the semidwarfness is conditioned by a single recessive gene. Hybridizations of the mutant with other varieties demonstrated that the semidwarfness gene can be transferred from one variety to the other. Besides, no hybrid sterility and continuous segregations were found in the subsequent generations. Because of these two promising performances, the mutated gene furnishes a plausible breakthrough in breeding *japonica* rice. Thus, experiments of induced mutations were conducted to search additional sources of semidwarfness. Two mutants, 72-534 and 72-536 with similar growth habit were induced by gamma irradiations from Tainan 5. The mutants were crossed to each other and also to their parental variety. The F_1 plants of the two mutant lines were semidwarf with culm-lengths of 75-80 cm, identical to that of their parents. The F_1s of the mutants and Tainan 5 have normal culm-lengths of 110-115 cm. The plant height of the cross segregated as a monogenic inheritance in the F_2 generation. The semidwarfness is recessive. The mutants from Tainan 5 were also hybridized with the CN242-d_3. All F_1s of the crosses carried normal tall-culms (Figure 1). This indicates that the genetics of semidwarfness induced by gamma irradiations from Tainan 5 differs from that of the former mutant CN242-d_3, though both of them are phenotypically semidwarf, and genotypically conditioned by a single recessive gene.

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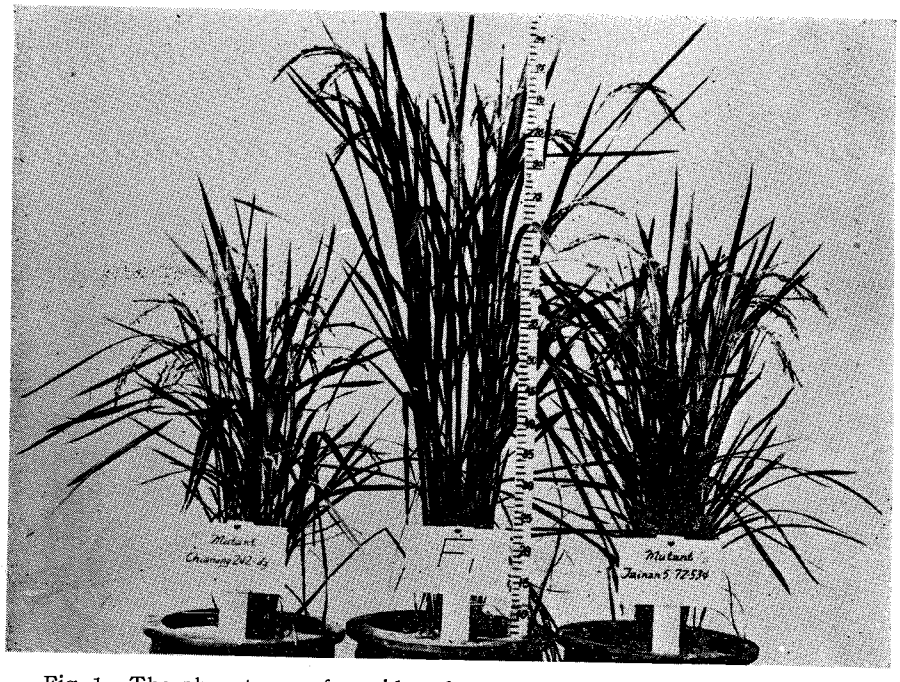

Fig. 1. The phenotypes of semidwarf mutants, CN242-d_3, Tainan 5, 72-534 and of their F_1 plant.

Two other mutants with the plant types of similar semidwarfness were also discovered from Chianung 242. The one induced by 25 kr x-irradiations carried relatively long panicles of 26–28 cm, which were similar to those of its parental variety and contrary to those of the CN242-d_3. The other was caused by superimposed treatments of 20 kr x-rays and 0.04 M hydroxylamine (HA) for four hours at 25°C. The genetics of these mutants is now being investigated.

Literature Cited

WOO, S. C., H. P. WU, and Y. MA. 1969. Ethylmethanesulfonate induced *japonica* erectoid rice with *indica*-like growth habit. Bot. Bull. Academia Sinica **10**(2): 124.

嘉農 242 號和臺南 5 號半矮生基因的誘變

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作者等曾報導嘉農242號的 EMS 矮生誘變體，CN242-d_3。由該品系和親系雜交結果，證明矮生型是由隱性單基因所支配。該基因可經由人工交配，自由轉移至其他粳稻。所得之後代均無顯著不稔及特性繼續分離之缺點。

本文繼續報導誘得之新矮生品系，得自臺南 5 號者有：72534，72536兩系統，兩系統第一代雜種之株高爲70–80公分，而和臺南 5 號之第一代雜種，株高爲105–110公分。第二代高低株之分離比爲 3:1。這結果顯示，該兩矮生系統之株高是受相同隱性單基因所控制。這兩種臺南 5 號之誘變系統和以前所提之 CN242-d_3 雜交，其第一代之株高達115公分。這表示該兩種誘自不同品種之誘變種，其外表雖屬相似均爲矮生多分蘗，但其基因座各異。

另有兩新獲之矮生系統，都得自嘉農242號。其一爲長穗約26–28公分，和親系相似，係受25 kr X-光引變。另一是由 X-光和 HA 化學劑共同使用而誘得，這兩誘變系統之遺傳習性正研討中。