

## Effects of Silicon on Upland Rice under Drought Condition

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### ABSTRACT

*Effect of silicon on upland rice under drought condition were studied in four upland rice varieties which were different in silicon uptake ability. These upland rice varieties included Hao, IRAT 191, SMG 9037-2-1-1-2 and SMGC 90002-4. Results of the study indicated that silicon in leaf blade increased as silicon concentration was increased in culture solution. Hao variety showed the highest silicon concentration in leaf blade, followed by SMGC 90002-4, SMG 9037-2-1-1-2 and IRAT 191, respectively. Results of this study revealed further that upland rice varieties, when grown under high silicon culture solution, resulted in increasing relative water content and decreasing stomatal resistance of leaves when compared with non-silicon culture solution. In addition, stomatal resistance showed highly negative significant correlation with both relative water content ( $r = -0.58^{**}$ ) and silicon concentration in leaf blade ( $r = -0.82^{**}$ ) whereas silicon concentration in leaf blade had highly positive significant correlation with relative water content ( $r = 0.74^{**}$ ). Since silicon concentration in leaf blade of upland rice varieties showed predominant characters in connection with drought resistance, hence, high uptaking and accumulating ability of silicon in leaf blade could be possible and helpful as a selection criterion for breeding and improvement of drought resistance in upland rice crop.*

**Key words:** Drought, Relative water content, Silicon, Stomatal resistance, Upland rice

### INTRODUCTION

Although silicon (Si) is not considered as an essential element for growth and development, addition of this element can increase growth and yield of rice (Yoshida, 1981; Takahashi et al., 1990; Takahashi, 1995; Savant et al., 1997). The beneficial effects of Si on rice growth are mostly attributable to the characteristics of the silica gel accumulated on the epidermal tissues. This accumulation helps alleviate water stress by decreasing transpiration, improving light interception characteristics by keeping leaf blade erect, increasing resistance to diseases, pests