AN AJSS

An Asian Journal of Soil Science

Volume **7** | Issue 2 | December, 2012 | 178-183

Research Article

Response to silicon fertilization by paddy in Typic Ustochrept (Goradu) soils of middle Gujarat

JUGAL K. MALAV, K.C. PATEL AND RAVI A. PATEL

Received : 06.03.2012; **Revised :** 25.06.2012; **Accepted :** 07.09.2012

MEMBERS OF RESEARCH FORUM :

Corresponding author :
JUGAL K. MALAV, Micronutrient Project (ICAR), Anand Agricultural University, ANAND (GUJARAT) INDIA
Email: jugalmalav966@gmail.com

Co-authors :
K.C. PATEL, Department of Agricultural Chemistry and Soil Science, B.A.College of Agriculture, Aand Agricultural University, ANAND (GUJARAT) INDIA
Email: kcpatel_05@yahoo.co.in

RAVI A. PATEL, Micronutrient Project (ICAR), Anand Agricultural University, ANAND (GUJARAT) INDIA
Email: raviagri1612@gmail.com

Summary

Preliminary survey work was carried out in paddy growing area of Anand and Kheda district of middle Gujarat to know the available silicon (Si) status in soils of paddy fields. Total sixty surface soil samples were collected and categorized as per available Si status in low, medium and high categories. Representative bulk soil samples were taken to conduct pot experiment to study the available Si and response to Si application by paddy in *goradu* soils of middle Gujarat. The soils were treated with four levels of Si *viz.*, 0, 100, 200 and 300 mg Si kg soil^{-1}. The experiment was planned in factorial completely randomized design with three repetitions. The Si application up to 200 mg kg^{-1} soil significantly increased grain and straw yields of paddy over control under low (< 25 mg Si kg^{-1} soil) and medium (25 - 50 mg Si kg^{-1} soil) category soils, while it was up to 100 mg Si kg^{-1} soil in high category soils. The further addition of silicon *i.e.* 300 mg Si kg^{-1} soil showed a declining trend. Si content in grain was significantly increased under medium and high categories of soils as compared to low category soils. The highest Si content in grain (2.74 %) was recorded in soils having high status of available Si *i.e.* high category soils. The Si content in straw was significantly increased at Si_{100}, Si_{200} and Si_{300} levels over control (5.94 per cent). The Si uptake by paddy grain and straw was significantly affected by Si levels in low and medium soil categories as compared to high category soils.

Key words : Silicon, Paddy, Silicon uptake

How to cite this article : Malav, Jugal K., Patel, K.C. and Patel, Ravi A.(2012). Response to silicon fertilization by paddy in Typic Ustochrept (Goradu) soils of middle Gujarat. *Asian J. Soil Sci.*, **7**(2): 178-183.

Introduction

Paddy is considered as silicon accumulator. An adequate supply of silicon to paddy from tillering to elongation stage increases the number of grains per panicle and enhances ripening (Korndorfer *et al.*, 2001). It is also suggested that the silicon plays a crucial role in preventing or minimizing the lodging incidence in the cereal crops, a matter of great importance in terms of crop productivity. The paddy occupies an area of over 44 million hectares (Duncan, 2005) and in middle Gujarat, total area under paddy cultivation was 4.30 lakh ha with total production of 7.20 lakh M. T. and productivity of 1540 kg ha^{-1} during 2008-09 (Anonymous, 2009). Paddy yields are declining in the post-green revolution era could be due to the imbalance in fertilizer use, soil degradation, type of cropping systems practiced and lack of suitable paddy genotypes for low moisture adaptability and disease resistance. The benefits from Si fertilization may include increased yield, enhanced disease and insect resistance and tolerance to stresses such as cold, drought and toxic metals. Various crops like wheat, cucurbits, corn and sugarcane have been shown to be benefited from Si fertilization.

Silicon plays a significant role in imparting both biotic and abiotic stresses and enhances productivity. It does not damage the plants upon its excess accumulation. Higher accumulation of Si in paddy has been demonstrated to be necessary for healthy growth and yield of paddy. For this reason, Si has been recognized as an "agronomically essential element" in Japan (Ma *et al.*, 2001). Considering the above scenario, there is a need to identify the nature and magnitude of the Si status of different paddy eco-systems and thereby developing suitable Si management agenda for obtaining or sustaining paddy yield potentials of improved paddy cultivars. Since, yield responses of paddy to Si application are related