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Do silicon fertilizers improve the fodder value of tropical grass species ?

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Key words : silicon fertilizer ,grass silicification ,fodder value ,tropical improve

Introduction Silicon has been reported as beneficial element for promoting growth and yield of plants . A wide range of species was found among tropical grasses : species with much higher concentration i.e . *Pennisetum unisetum* (>13.5% in blades) , *Panicum maximum* Jacq (>7.5%) , and species having contents between 2.2% and 6.9% (Kindomihou 2005) . An important preoccupation is how to reduce silica concentration in their leaves to improve their palatability , digestibility and nutrient value for animal high productivity . We examine the effect of silicon supply on Silica accumulation and other structural and functional traits of some tropical fodder grass species .

Plant and soil materials , Fodder grass experiment , Measurements Six tropical grasses were selected by their high forage value and because they provide essential tropical grassland biomass for animal consumption : *Andropogon gayanus* var *Bisquamulatus* (Hochst.) Hack , *Brachiaria ruziziensis* , *Panicum maximum* cultivar ORSTOM C1 , *Panicum maximum* cultivar T673 , *Panicum maximum* cultivar T58 and *Panicum maximum* Jacq . cultivar local . The soil used in the experiment , taken from the Research Institute for Bioresources station of Kurashiki in Okayama University (Japan) , is a clay soil .

A complete randomized design with 3 replications was prepared using silica gel treatments . Fractions of soil that had passed a 2 mm sieve were used for pot culture . Grass clumps were cultured in pots for 2 weeks and then transplanted in another pots containing 3.3 kg of soil . Each pot contained 3 tillers per replication in 3 replications (i.e . 9 tillers per pot) and the soil was irrigated with distilled water every day . The soil had received 0 or 100 g of silica gel which was known with no effect on soil pH , to create two treatments : plus silicon and minus silicon . Plants were grown in greenhouse for three months after transplantation (29 April-29 July 2006) , and harvested .

Shoot biomass was measured . Si and P concentrations in shoots were analysed by the colorimetric method using Spectrophotometer (Jasco , Japan) . Morphological traits i.e . leaf blades length , width , and leaf area were determined . Functional and structural traits i.e . specific leaf area , specific leaf mass , leaf water content , shoot water content , leaf density and leaf thickness were recorded . ANOVA , Pearson Coefficient analysis and Post hoc test were performed using STATISTICA 7.0 .

Results and discussion Shoot biomass increased significantly in response to Si supply and species respond differently in Si accumulation . *Panicum maximum* T58 showed the highest values for shoot biomass and P concentration while *P. maximum* C1 showed the lowest shoot biomass and the highest Si concentration . *Andropogon gayanus* showed the lowest Si and P concentrations in response to Si supply . Globally , Si supply increased water content in shoots , as well as the leaf dry matter and the leaf area . Changes were also highlighted in correlations between traits : negative correlation between shoot Si and blade width/blade dry matter , leaf Area and leaf density . Supplying silicon significantly increased both Si and P concentration in shoot and blades which are the most grazed parts of fodder grasses . These results show that Silicon fertilizer could improved fodder value of some tropical grass species as previously suggested by investigations on fodder grasses (Eneji *et al.* 2005) , maize and other crops (Chunhua *et al.* 2001) and rice (Mauad *et al.* 2003) .

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