16 Salinity-induced expression of SsHKT may be crucial for Na\(^+\) exclusion from the leaf blade in huckleberry (Solanum scabrum Mill.)

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Na\(^+\) exclusion from the leaf blade is an important trait in salinity tolerance and high affinity K\(^+\) transporters (HKT), particularly class I HKTs, are known to play significant roles in the process. Previously, huckleberry and eggplant were shown to display differential Na\(^+\) accumulation characteristics under salt stress; whereas huckleberry accumulated less Na\(^+\) in leaf and more in root and stem, eggplant accumulated more Na\(^+\) in the leaf. The restricted transport of Na\(^+\) to the leaf in huckleberry was believed to be the key feature in enhancing its growth over that of eggplant. However, the mechanism underlying this restricted Na\(^+\) transport has not been elucidated and thus constitutes the objective of the present study. Five-week-old seedlings of huckleberry and eggplant were grown under 0 and 50 mM NaCl in a hydroponic medium for 10 days. The growth, Na\(^+\) and K\(^+\) contents and HKT expression were analyzed in root, stem, petiole and leaf blade of both plants. Huckleberry accumulated more Na\(^+\) in the root (52\%) and stem (29\%) than in the leaf blade (15\%), with a corresponding enhanced expression of the Solanum scabrum HKT (SsHKT) in root (28-fold) and stem (7-fold). Eggplant on the contrast accumulated 60% of total Na\(^+\) in the leaf blade, with a weaker S. melongena HKT (SmHKT) expression in the root (3-fold) and its repression in other tissues. Since both genes are class I HKTs, it is likely that the Na accumulation characteristics of both plants owes to the differential expression of HKT genes, with SsHKT exerting a stronger control of Na\(^+\) reaching the leaf blade in huckleberry than does SmHKT in eggplant.

17 Influences of agricultural landuse on soil morphological and chemical properties on sandy beach ridges interspersed with swales in peninsular Malaysia

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Along the east coast of peninsular Malaysia, alternating sandy beach ridges and low depression areas are found parallel to the shoreline, called as Beach Ridges Interspersed with Swales (BRIS). Due to its quite sandy texture, soils have been regarded as problematic for agricultural use. Recently, intensive farming practices are expanding with high input of chemical fertilizers. This study was conducted in an experimental field of Malaysian Agriculture Research Development Institute in the Pahang state. Three transect (1 km) lines were established from shoreline toward inland: Two lines were set through the experimental field (Trs. 1 and 2 - fruit-tree farm or grassland) while one line in the adjacent remnant forest (Tr. 3). Soil profile was described at 150, 500 and 900 m from the shoreline while soil horizon stratification was observed at every 50 m intervals by using a soil testing rod. In both survey, soil samples were collected based on the horizons for physicochemical analysis. The sand contents of the soils exceeded 96%. The soils were classified into Typic Quartzipsamments from shoreline until 400 m and Typic Haplohumods from 400 m. The 0 horizon was absent in Trs. 1 and 2. The A horizons on Trs. 1 and 2 were shallower with brighter color and less roots compared with Tr. 3. The morphological feature of the B and C horizons were not different among the transects, T-C and T-N contents of the A horizon were lower in Trs. 1 and 2 than in Tr. 3, indicating the loss of soil organic matter by agricultural practices. This tendency was more obvious in the area of the Psamment. The C/N ratio of the A horizon in the Psamment area was higher on Trs. 1 and 2 than in Tr. 3 while the opposite tendency was found in the Humods area, suggesting the different mechanism of soil organic matter decomposition and N dynamics. At the Humods area, available P was accumulated in the Bhs horizon, which could be ascribed to the immobilized P with the components of the Bhs horizon. While the level of exchangeable Ca was higher in the A horizon on Trs. 1 and 2 than Tr. 3, the depletion of exchangeable K was found on Trs. 1 and 2. Appropriate management systems should be developed to sustain soil fertility of the BRIS.

18 Soil P Status in an Oil Palm Plantation in Central Pahang, Malaysia

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For oil palm cultivation in Malaysia, P is the third most added input to the soil, next to K and N. P-fertilizer, mostly as phosphate rocks, is applied around the canopy circle of palm trees (called as weeded circle) while some portion of the plant P could be expected to return to soil through decomposing fronds that are threshed upon harvest of fruit bunches and piled up in-between palm trees (frond heap). No P is applied at the operation path for harvesting and transporting (harvest path). In this study, soil P status was evaluated at the three micro-sites in oil palm fields with different planting ages of 5 years (OP5), 10 years (OP10) and 18 years (OP18) in Pahang, Malaysia. Bray II P (Bray and Kurtz, 1945) and total P were determined while soil P was fractionated by using the modified sequential P fractionation method (Tiessen and Moir, 1993). The soils of the weeded circle showed the highest content in all P fractions as well as Bray II P and total P; in OP 10, for example, the average value of the total P (0-3cm) were 4476 mg P kg\(^{-1}\), 288 mg P kg\(^{-1}\), 948 mg P kg\(^{-1}\) at the weeded circle, frond heap and harvest path, respectively. In spite of regular input of organic matter at the frond heap, the levels of organic P fractions (NaHCO\(_3\) P and NaOH P) at the frond heap were lower than those at the weeded circle and were almost similar to those at the harvest path. In terms of planting age, the contents of Bray II P, total P and HCl P in the weeded circles increased with planting age and were the highest in OP 18. These results suggest some portion of applied phosphate rock remained undissolved. Therefore, current P management strategy should be reconsidered for more efficient uses of P resources.