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Regularity in Variation of Leaf Color and Nitrogen Distribution in Half-leaf Blades by Leaf Position on the Stems of Rice Plants : I. Variation of chlorophyll meter values and mechanism of leaf formation

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Abstract:
We clarified that the degrees of the difference in color between outside and inside half-leaves were unexpectedly large, which ranged from 1.3 to 5.4 values by the Minolta chlorophyll meter SPAD-502 (corresponding to 0.1 to 0.5% N content) in three Japanese and three American cultivars. The color intensity of a half-leaf with an outside margin in the leaf sheath wrapping (outside half-leaf) was deeper and its width was narrower than that of an inside half-leaf. There was a regularity in the growth pattern of leaves, namely, a deep-colored half-leaf (outside half-leaf) and a light-colored half-leaf (inside half-leaf) were disposed on the stem with a regular alternation in order of the well-known right- and left-handed emergence of leaves. This meant that the position of an outside (or inside) half-leaf in the (n)th leaf was governed concordantly by the previous (n-1)th leaf. This concordance tended to appear from the third leaf position, and the concordance ratio was low at lower early-emerging leaves, and high at upper late-emerging leaves as already described. A 100% ratio of concordance was obtained at the higher leaf positions than at the sixth or seventh leaf in this experiment. The chance of a left (or right) half-leaf becoming an outside (or inside) half-leaf was approximately 50%. When seeds were centrifugalized to determine the effects of centrifugal force on leaf emergence at germination, the chance of the centrifugalized side becoming an outside half-leaf was increased.

Keywords:
Chlorophyll meter, Concordance, Cultivar, Half-leaf blade, Leaf blade width, Leaf color, Rice plant, Right- and left-handedness

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