Cultivar Differences in Morpho-physiological Characteristics in Relation to *Leaf* Senescence of Rice During Spikelet Filling.

Crop Experiment Station, Park, T. S., IRRI, B.S. Vergara, R. Visperas

登熟期中 벼 잎 老化와 關聯된 形態-生理的인 特性들의 品種間 差異

작물시험장 박 태식, 국제벼연구소 비.에스.벨가라, 알.비스페라스

The specific objectives of the study area:

To classify the *senescence pattern in rice* varieties during spikelet filling at low light intensity.

MATERIALS AND METHODS

Plant materials. 12 rice cultivars, 3 advanced lines, 1 mutant, 4 isogenic lines (Table 1) were used in this experiment. These materials have shown to have early, medium, and late type of senescence in the laboratory and field experiment

Raising of plant: The germinated seeds were sown in plastic trays containing paddy soil. One 10-day-old seedling was transplanted in a 4-liter plastic pot (1/5000 a wagner pot) containing 4 kg of puddled Maahas clay soil (Andaquaptic Haplaquoll) mixed with 4 g ammonium sulfate (21% N), 2 g of solophos (18% P_2O_5) and 2 g of muriate of potash (60% of K_2O) on 14 June 1990. About 2 cm water depth was maintained in the pots.

RESULTS AND DISCUSSION

Using the chlorophyll (CHL) content of the upper three leaves, the 20 rice cultivars and lines grown in pots were grouped into three types (Method I): a) high CHL-slow senescence, b) medium high CHL-medium senescence, and C) low CHL-early and rapid senescence. Using the rate of CHL loss, the cultivars were classified into four groups (Method II): a) slow senescence, b) moderate slow senescence, c) medium senescence, d) rapid senescence. Senescence in this experiment was evaluated by the CHL content of the leaves. About 75% of the initial CHL content was reached at 14 days after heading (DAH) in the third leaf from top, 20 DAH in the penultimate (2nd) leaf and 26 DAH in the flag leaf in 20 cultivars and lines. Photosynthetic activity was maximum at 5 DAH and the activity decreased according to age-related CHL loss up to 26 DAH when it reached the minimum level. Leaf area, leaf weight and specific leaf area in the slow senescent type cultivars showed less reduction with time than the other types. Rice cultivars and lines can be grouped according to Method I or II by using the actual CHL content or the rate of CHL loss of upper three leaves, respectively, as measured by a CHL meter from heading to maturity. It was found that the best leaf to use in classifying cultivars is the penultimate leaf at 20 DAH rather than the flag leaf or the third leaf because the flag leaf lose CHL too slow while the third leaf has rapid decrease in CHL.

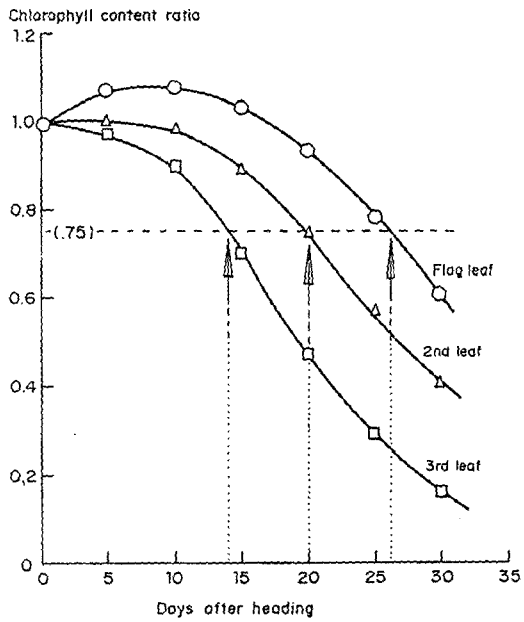

Fig. 1. Rate of chlorophyll loss of upper three leaf blades at flowering up to maturity, average of 20 cultivars and lines. IRRI greenhouse 1990 WS.

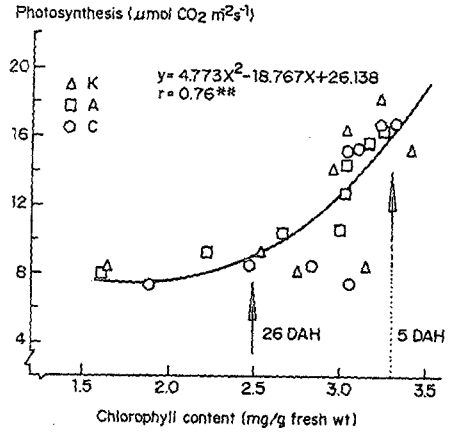

Fig. 2. Relationship between photosynthetic activity and chlorophyll content of flag leaves at flowering up to maturity with three treatments, Kinetin (K), ABA (A) and Control (C) in two rice lines, Wx185-NR, and Wx185-ES. IRRI greenhouse 1990 WS.

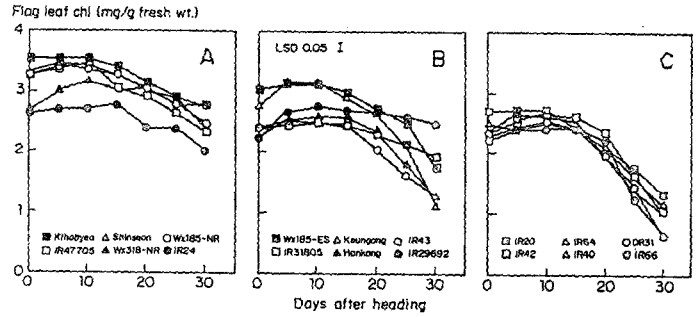

Fig. 3. Changes in the chlorophyll content of the flag leaf blades at flowering up to maturity classified into type A (high CHL-slow senescence), B (medium to high CHL-medium senescence), C (low CHL-early senescence) based mainly on quantity of chlorophyll. IRRI greenhouse 1990 WS.

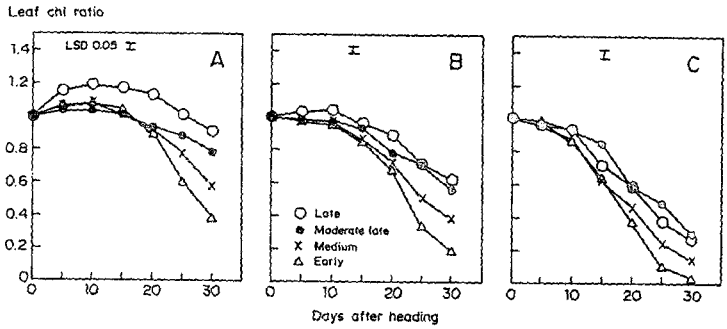

Fig. 4. Changing of the rate of chlorophyll loss of upper three leaf blades, flag (A), penult (B) and third (C), at flowering up to maturity in four groups which were classified with 18 cultivars and lines by the rate of chlorophyll degradation. IRRI greenhouse 1990 WS.