P067

Genotypic differences of Chinese milk vetch (*Astragalus sinicus* L.) in winter hardness

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Objectives

Morphological and physiological responses of Chinese milk vetch (CMV) to frost temperature during overwinter were evaluated to know the optimal cultivation practices for introducing CMV into cropping system in middle region of Korea. The differences in morphology and physiology of CMV plant offer a cue for developing frost tolerant CMV genotype.

Materials and Methods

- CMV genotypes and cultivation practices
  CMV genotypes tested in the experiment were from different regions, Paju, Namyangju, Wando, and China (introduced). CMV seeds were sown in Gyeongsang National University experimental farm with a sowing rate of 5 kg 10 a^{-1} on Sep. 15.
- Morphological examination was carried out at Apr. 7 for leaf angle, shoot and root weight, stem diameter, etc.
- LT50 was measured with detached leaf discs in low temperature circulation bath.
  Photosynthetic property was measured by portable chlorophyll fluorescence meter.
  Content of chemical components in leaves were measured spectrophotometically.

Results

- The ratio of root to shoot was greater in Paju collection than other genotypes. The introduced genotype form China showed abundant aerial part.
- LT_{50} of genotypes reflects the winter hardness. Paju collection showed the lowest LT_{50} value among genotypes.
- Canopy of tolerant genotype (Paju collection) consisted of planophile leaves (less leaf angle from soil surface).
- Among the levels of leaf chemical components, anthocyanins and chlorophyll content were lower in Paju collection than other genotypes.

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Table 1. Morphological characters of CMV plant collections on Apt. 7

Genotype	Leaf angle (°)	Plant height	Shoot FW (g)	Moisture content (%)	Root FW (g)
Paju	63.8c*	19.0d	9.30b	84.0b	1.83a
Namyangju	75.7a	31.8b	5.83c	86.8a	0.45b
Wando	67.9b	25.4c	6.36c	83.3b	0.67b
China	73.2a	34.9a	24.82a	85.0b	1.71a

*) Means followed by same letters in a column are not significantly different at 5% level by DMRT.

Table 2. Comparisons of chemical components CMV genotypes on Mar. 26

Genotype	Anthocyanin (mg/g FW)	Chlorophyll (mg/g FW)	Reducing sugar (mg/g FW)	Proline (mg/g FW)
Paju	70.7±6.2	3.85±0.07	27.0±0.9	0.16±0.02
Namyangju	88.1±2.3	4.32±0.32	26.6±1.3	0.18±0.02
Wando	97.6±8.3	4.58±0.35	27.5±3.1	0.26±0.02
China	88.1±6.9	4.57±0.35	27.6±1.0	0.07±0.03

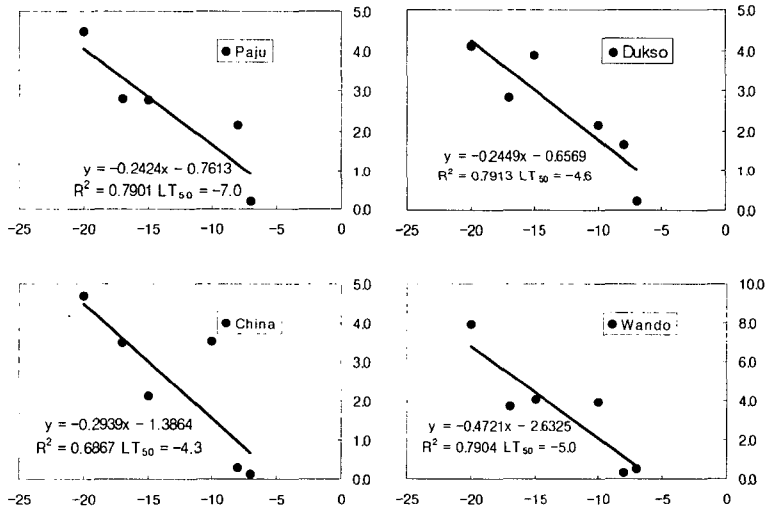

Fig. 1. Relationship between freezing temperature and solute leaching (logit) in upper leaves of CMV (chinese milk vetch) on Mar 20. X and Y axis indicate the treated temperature and logit response of leaf discs, respectively.

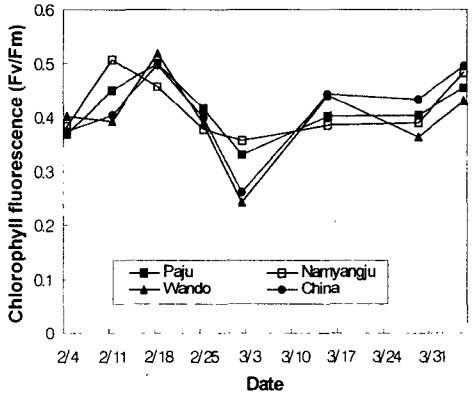

Fig. 2. Changes of chlorophyll fluorescence of CMV genotypes collected in different regions during overwintering period.