（学位第３号様式）

学 位 論 文 要 旨

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題　目	**Analysis of Genotypic Variation in Photo- and Thermo-sensitivities in Soybean (Glycine max (L.) Merrill) Adaptable to Tropical Areas**

The demand for soybeans in tropical Asia as a major protein resource has been increasing. However, the proportion of self-supply in most Asian countries are extremely low because of low productivity. Soybean production in tropical area faces many problems, including short photoperiod and high temperature. Short photoperiod and high temperature could stimulate flower open early, result in insufficient vegetative growth therefore low seed yield. To assure certain vegetative growth, the sensitivities to photoperiod and temperature, and the juvenile growth property could be key factors to determine desirable genotypes for these regions. In order to determine a suitable soybean genotype adaptable to tropical area, a series of experiments were conducted for the evaluation of variation in photo- and thermo- sensitivities using 82 genotypes of soybean world mini-core collections (*GmWMC*).

At field condition, *GmWMC* genotypes were sown in late May (for long photoperiod) and early August (for short photoperiod). The days from emergence to flowering (DEF) ranged 23-92 days under long photoperiod, but 19-63 days under short photoperiod. The DEF were shortened by short photoperiod in all genotypes. Same trends were also observed in the duration for pod formation and seed filling, but not for pod elongation. Seed yield under short photoperiod also varied widely (1.4-40.0 g per plant), it was highly correlated with DEF ($r = 0.61$, $p<0.001$), stem height ($r = 0.55$, $p<0.001$) and total node number ($r = 0.66$, $p<0.001$), indicating low seed yield was clearly caused by less vegetative growth. Because these responses under field condition are the results of interaction of fluctuated photoperiod and temperature seasonally, *GmWMC* soybean were also grown in a growth chamber which the day/night temperature were set at 25／18℃, 28／22℃, 33／28℃, and 12 hours for photoperiod. The DEF was longer in lower temperature in all genotypes, however, the accumulated temperature from emergence to flowering (ATEF) did not respond to the change in temperatures, suggesting that ATEF could represent photosensitivity better than DEF in natural conditions, and temperature might affect plant development quantitatively in soybean. Furthermore, the photo-sensitivity in *GmWMC* soybean were tested under 10 h for short photoperiod and 13 h for long photoperiod in the growth chamber at 28℃.The DEF were 20-49 days under 13 h, whereas were 20-31 days under 10 h. The photo-sensitivity (reduction of DEF by short photoperiod) varied from 0.00 to 0.47. Considering the difference in DEF at 10 h could represent the relative juvenile growth phase (JGP), some genotypes were found with i) low photo-sensitivity and short JGP; ii) low photo-sensitivity and long JGP; iii) high photo-sensitivity and short JGP; and iv) high photo-sensitivity and long JGP. The genotypes with long JGP would be important resources for improving soybean production in tropical areas.