DEVELOPMENT OF WEED DAMAGE EARLY DIAGNOSIS PROGRAM

S. Takayanagi
National Agriculture Research Center, Tsukuba Ibaraki 305, Japan

Summary A weed damage early diagnosis program on soybean and southern crabgrass was developed using a PC. This program, namely the weed damage prediction model, was named WEDPREM. Prediction values of yield loss of soybean caused by crabgrass, determined by WEDPREM, fit well with values observed in the field experiments.

INTRODUCTION

Establishment of an appropriate and economical weed control method requires prediction of the yield loss of a crop caused by weed damage at early growth stages of crop and weed. A weed damage early diagnosis program WEDPREM on soybean (*Glycine max* Merr.) and crabgrass (*Digitaria ciliaris* (Retz.) Koeler) was, therefore, developed using a PC, operation system – MS-DOS and computer language – BASIC.

EXECUTION OF PROGRAM

WEDPREM runs easily. Firstly read the meteorological elements, usually annual, mean and normal daily mean air temperature, daily radiation and day length, from the data file. Next, input the sowing date of soybean and of each emergence date and planting density of soybean and crabgrass.

Then, using a model constructed by system dynamics, growth, development and mechanisms of light competition for soybean and crabgrass in a mixed stand are simulated.

Finally, yield loss of soybean can be predict from the weed weight ratio per mixed stand {(top dry weight of crabgrass)/(top dry weight of soybean + top dry weight of crabgrass)} at flowering stage of soybean obtained from the simulation.

DISCUSSION AND CONCLUSIONS

Predicted values of yield loss of soybean caused by crabgrass determined by this program matched well with values observed in the field experiment (r^2=0.8769, n=27) and showed that the model WEDPREM is of practical benefit.

Kropff *et al.* (1993) concluded that until now modelling efforts in weed science have concentrated on crop-weed competition and population dynamics excluding other critical areas like inversion, rate of spread, effectiveness and economics of weed control. The future challenge for modelling in weed science will be the development and integration of the different components. This paper is one of the new component to meet this challenge.

REFERENCES

Kropff, M.J, Lotz, L.A.P. and Weaver, S.E. (1993). Practical Applications. *In* 'Modelling crop-weed interactions', eds. M.J. Kropff and H.H. van Laar, pp. 149-67. (CAB International, Wallingford, UK).