

Interestingly, there was little phytotoxicity with any of the herbicides, although DOWCO 453 and CGA 89725 did seem to show some potential for phytotoxicity. This study was conducted on a turfgrass consisting predominately of annual bluegrass and fine fescue. Another field study was initiated to look at the phytotoxicity potential of these herbicides on Kentucky bluegrass. This study was put out on August 28 at the Hancock Turfgrass Research Center.

The three herbicides which showed the most promise, Poast, CGA 82725, and DOWCO 453, were tested on Kentucky bluegrass along with HOE 35609, an experimental herbicide for quackgrass control. The three herbicides from the original postemergence study all showed unacceptable levels of injury. The data in Table 5 shows ratings of the treatments 47 days after application. At this time the Poast treatments had recovered from the herbicide injury but DBA 82725 and DOWCO 453 treatments still had not recovered. The injury from these herbicides develops slowly taking 3-5 weeks for the grass to go off color. The injury symptoms were exhibited for a period of about six weeks. The length of time the injury symptoms are expressed is totally unacceptable on Kentucky bluegrass. The fact that these herbicides seem to be much less phytotoxic to annual bluegrass and fine fescue merits further research.

Table 5. Phytotoxicity to Kentucky Bluegrass with New Herbicides. Hancock Turfgrass Research Center. Treated: 8/28/83. Rated: 10/14/83.

Treatment		Rating
Chemical	Rate	Lowest Rating Indicates Least Phytotoxicity
Poast + OC	.2 lb/A	1.0 A
Poast + OC	.15 lb/A	.13 A
Hoe 35609	.5 lb/A	1.5 A
Check		1.7 AB
Hoe 35609	1.0 lb/A	2.3 AB
CGA 82725 + OC	.25 lb/A	3.0 B
CGA 82725 + OC	.5 lb/A	4.8 C
Dowco 453 + OC	.2 lb/A	5.7 C
Dowco 453 + OC	.15 lb/A	7.7 D

* Treatments having the same letter are not significantly different. Mean separation by Duncan's MRT (5%) Standard error = .4; F = 30.59.

Environmental Fate of Agricultural Chemicals Using Model Ecosystems

To complement the field studies on pesticide efficacy, a model ecosystem has been developed to examine the total fate of an agricultural chemical applied to turf. These model ecosystems will go far beyond field studies in providing clues as to how pesticides are affected by soil and thatch and how to improve pesticide effectiveness.

The model ecosystem consists of a 31.5 x 30.5 x 5.0 cm (LxWxH) stainless steel base on top of which rests a 23.5 x 31.4 x 16 cm (LxWxH) glass chamber. The glass chamber was constructed from 0.625 cm plate glass. On one face of

the glass chamber twenty 0.625 cm air intake holes have been drilled. On the opposite face six 0.625 cm air outake holes have been drilled. The air intake holes are concentrated to one opening by placing a 2 x 20 x 4 cm (LxWxH) glass cover over the holes with 1.27 cm hole opposite the six holes in the main chamber. A cross flow of air over the tops of the plants is achieved.

The stainless steel base was constructed from 0.625 cm plate for the base and 0.32 cm plate for the sides. Strips of stainless steel 1.27 x 0.32 (WxH) were soldered along the inside edge of the base to form a ledge upon which rests a 1.27 cm thick porous ceramic plate. The porous ceramic plate allows simulation of field drainage conditions removing the artificial nature of soil water relations in most container grown plants.

The unique quality of the model ecosystems is that the turf samples are in a totally enclosed environment allowing the monitoring of all forms of loss of an agricultural chemical from the soil surface. The volatile losses of nitrogenous fertilizers can be easily studied using model ecosystems. The fate of fungicides, pesticides, and plant growth regulators in the soils can be conveniently studied using model ecosystems. The model ecosystems are an excellent method to study a large variety of problems concerning agricultural chemicals and to profile information to improve their use and efficiency.

A prototype of the model ecosystem has been constructed and is currently undergoing testing. Assuming the prototype proves of sufficient quality, an additional seven model system will be constructed.