

# Bio weed control's promise

*The work of Dr. Nick Christians and others at Iowa State University is unlocking the potential of "natural" weed controls.*

by RON HALL/ Managing Editor

**W**hen Dr. Nick Christians started working with corn gluten meal 11 years ago he wasn't looking for a "natural" weed control. In fact, he wasn't looking for a herbicide at all. He was doing experiments focusing on *Pythium*.

What he discovered, though, has since developed into one of the first commercially available "natural" pre-emergence herbicides for the turfgrass market. It provides a valuable, if still expensive, tool for turf managers.

It's also the first in what is certain to be a family of natural herbicides for turf and other crops too. Iowa State University has gained patents on the use of corn gluten meal, and other natural products, in the manufacture of these pre-emergence products. All of this resulted after Christians discovered that something in corn gluten meal, which he was using as a laboratory growing medium, inhibited root development in germinating plants. "It seemed to be a growth regulator effect," he explained.

He noticed that after normal germination, the bentgrass plants toppled over and died. This occurred as growing conditions dried. He identified the

source of the activity as corn gluten meal (CGM), a by-product of the wet milling process of corn.

But what was it about the CGM that he was using, which was 60 percent corn protein, 10 percent nitrogen by weight, that caused germinating plants to die?

The question kicked off months of painstaking laboratory work by Dianna Liu, a talented student who had just finished her masters in food chemistry. Liu first developed a water soluble CGM extract. It contained a high level of the inhibitory compounds. From this extract, Loo was able to identify five distinct compounds that had biological activity in the CGM extract. They are called dipeptides. (Since then, Liu has also isolated a promising pentapeptide from CGM.)

Products arising from these discoveries are now entering the turfgrass market. Because the CGM is 10 percent nitrogen by weight, it fertilizes turfgrass as it provides weed control.

Gardens Alive, a company specializing in natural products, was the first to gain a license from Iowa State to market a CGM-based pre-emergent/fertilizer combination for turf. It called the product A-Maizing Lawn. One application—20 lb.

per 1,000 sq. ft.—in the spring provides 2 lbs. N, plus the natural herbicide. A second application in mid August provides added control plus another 2 lbs. of N. The Indiana company sold the product mail order the past two seasons. Sales were stronger than expected, said Christians, despite the product's hefty price tag.

Iowa State is in the process of licensing others to market the natural pre-emergence product. The price should fall, he explained. Even so, it can't compete pricewise with chemical pre-emergence.

"It's going to expensive," said Christians. "If you want to use a standard weed and feed, you can do it cheaper.

"It's not going to be like a standard such as pendimethalin or whatever you happen to be using that gives 90 percent control the first time."

In fact, the corn gluten meal's activity seems to be cumulative. Christians' field tests showed 60 percent control of crab grass with the first season's application, about 80 percent for second-year applications and 90 percent the third.

Further studies have shown that the CGM product has activity against many broadleaf weeds too, including black medic, black nightshade, chickweed and dandelions. **LM**

**COMPARISONS OF THE PERCENTAGE OF CRABGRASS CONTROL IN KENTUCKY BLUEGRASS PLOTS TREATED WITH GRANULAR CORN GLUTEN MEAL (CGM) IN 1991 THROUGH 1995.**

lbs. CGM 1000 sq. ft.	lbs N 1000 sq. ft.	Percent Crabgrass Reduction				
		1991	1992	1993	1994	1995
0	0	0	0	0	0	0
20	2	58	85	91	70	36
40	4	86	98	98	97	88
60	6	97	98	93	98	93
80	8	87	93	93	87	75
100	10	79	94	95	86	75
120	12	97	100	100	98	84

**COMPARISONS OF THE PERCENTAGE OF BROADLEAF WEED REDUCTION IN KENTUCKY BLUEGRASS PLOTS TREATED WITH GRANULAR CORN GLUTEN MEAL (CGM) IN 1994 AND 1995**

lbs. CGM 1000 sq. ft.	lbs N 1000 sq. ft.	Percent Weed Reduction			
		CLOVER		DANDELION	
		1994	1995	1994	1995
0	0	0	0	0	0
20	2	81	56	71	49
40	4	90	64	100	77
60	6	98	93	100	89
80	8	100	76	98	96
100	10	94	84	100	98
120	12	90	93	100	100

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