

TECHNOLOGY

Food-Safety Strategy Pits Germ vs. Germ

By SCOTT KILMAN

ing can still happen.

Staff Reporter

As food p
tists are fight
ganisms into
not taking the

Though c
safety of the
unconvention

method, known as
biocompetitive ex-
clusion, is gaining
support as cheap,
pesticide-free and
accurate.

At the moment,
the U.S. is losing
the food poisoning
war. The way food
is produced and eaten today is making life

Shouting Matches

Dr. Cotty wants to try his idea on an entire cotton valley in Arizona. But food-safety conferences have erupted into shouting matches over his biocompetitive

In the Lab



same principle might work on a range of livestock for other pathogens such as the E. coli strain that caused the Jack in the Box poisonings. But many questions remain, including whether the digestive system of a ruminant animal is too complicated for this process.

The most controversial biocompetitive project is run by Peter J. Cotty, a plant pathologist who decorates his Agriculture Department business card with a fungus

concept. The
ccessful 100%
nes, a micro-
International
icultural seed
bad chicken

hopeful that the

Others are worried about the safety of handling *Aspergillus flavus*. Toxic or not, the spores can grow in the lungs of people with weakened immune systems. And some seed companies are aghast that the government would consider releasing a fungus that would still infect plants even if it doesn't taint the crop with a carcino-

gen. ~~with weakened immune systems. And~~
some seed companies are aghast that the government would consider releasing a fungus that would still infect plants even if it doesn't taint the crop with a carcino-

gen.
Dr. Cotty argues that his technique isn't any worse than farmers blindly modifying the microorganisms in their fields by working the soil. He says the technique doesn't change the fungal population in a field, just whether it is poisonous. "It is much more clever to select the fungi that will grow in our fields just like we select the plants," he says.

THE WALLSTREET JOURNAL
TUESDAY, MARCH 16, 1993



Composition of *Aspergillus flavus* Communities in Soil of Treated and Nearby Fields in May 1996 Prior to Application of AF36 and in May 1997 One Year After Application

Field type	Fields (#)	AF36		S strain		<i>A. flavus</i>	
		(% <i>A. flavus</i>)		(% <i>A. flavus</i>)		(CFU/gram)	
		1996	1997	1996	1997	1996	1997
Treated	3	4% ab	85% a	52% a	4% d	582 a	365 a
Adjacent	4	2% b	48% b	41% a	18% c	411 a	157 a
Diagonal	4	2% b	16% c	52% a	33% b	61 a	100 a
Other	4	9% a	9% c	43% a	50% a	109 a	98 a

Other

Adjacent

Treated

Adjacent

Other

Other

Other

Diagonal

Adjacent

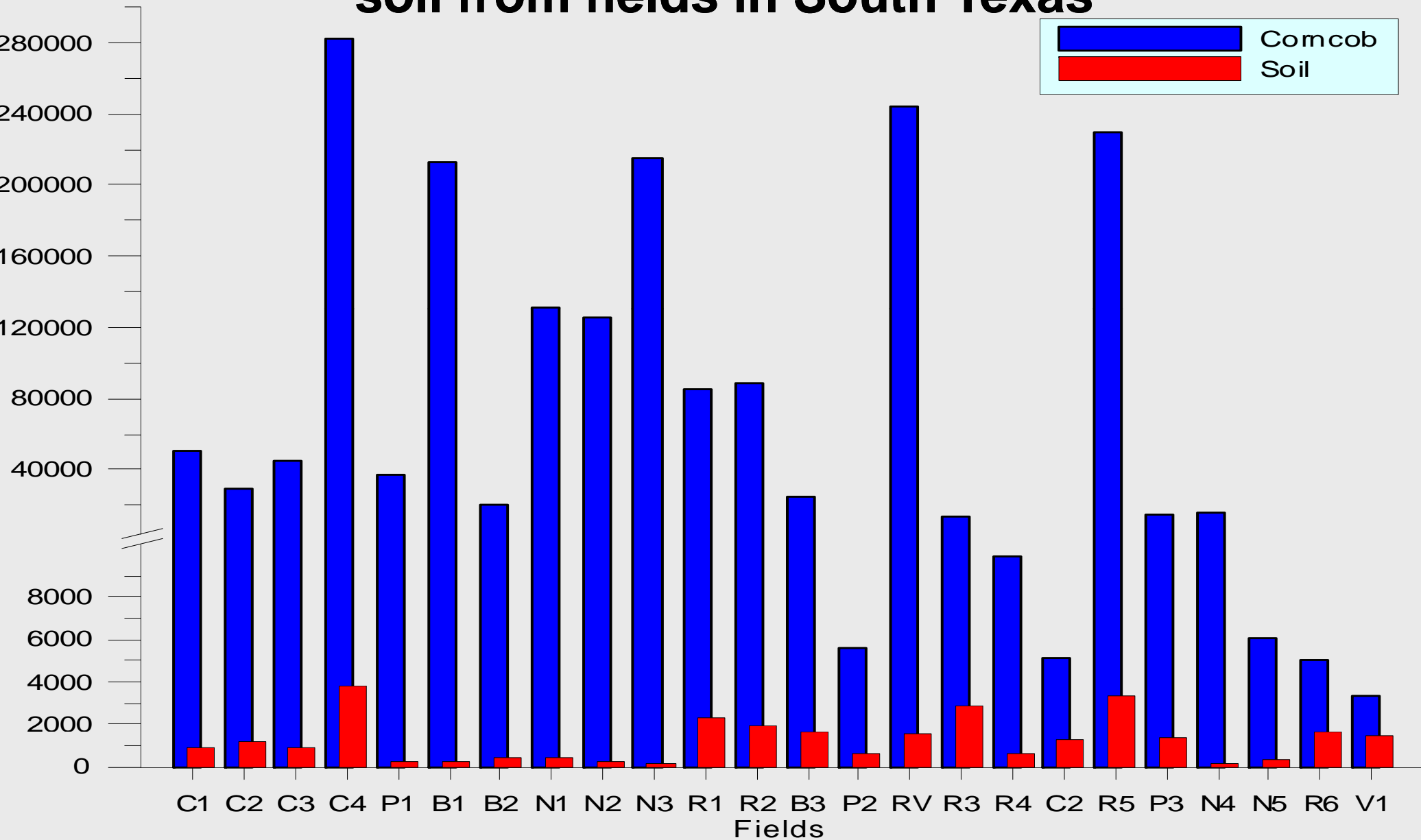
Diagonal

Other

Other



Quantity of *A. flavus* per gram (CFU/g) of corncob and soil from fields in South Texas



Aspergillus flavus Communities Resident in Agricultural Fields have a Greater Incidence of the Highly Toxigenic S Strain than those Resident in Desert Sites with Native Vegetation

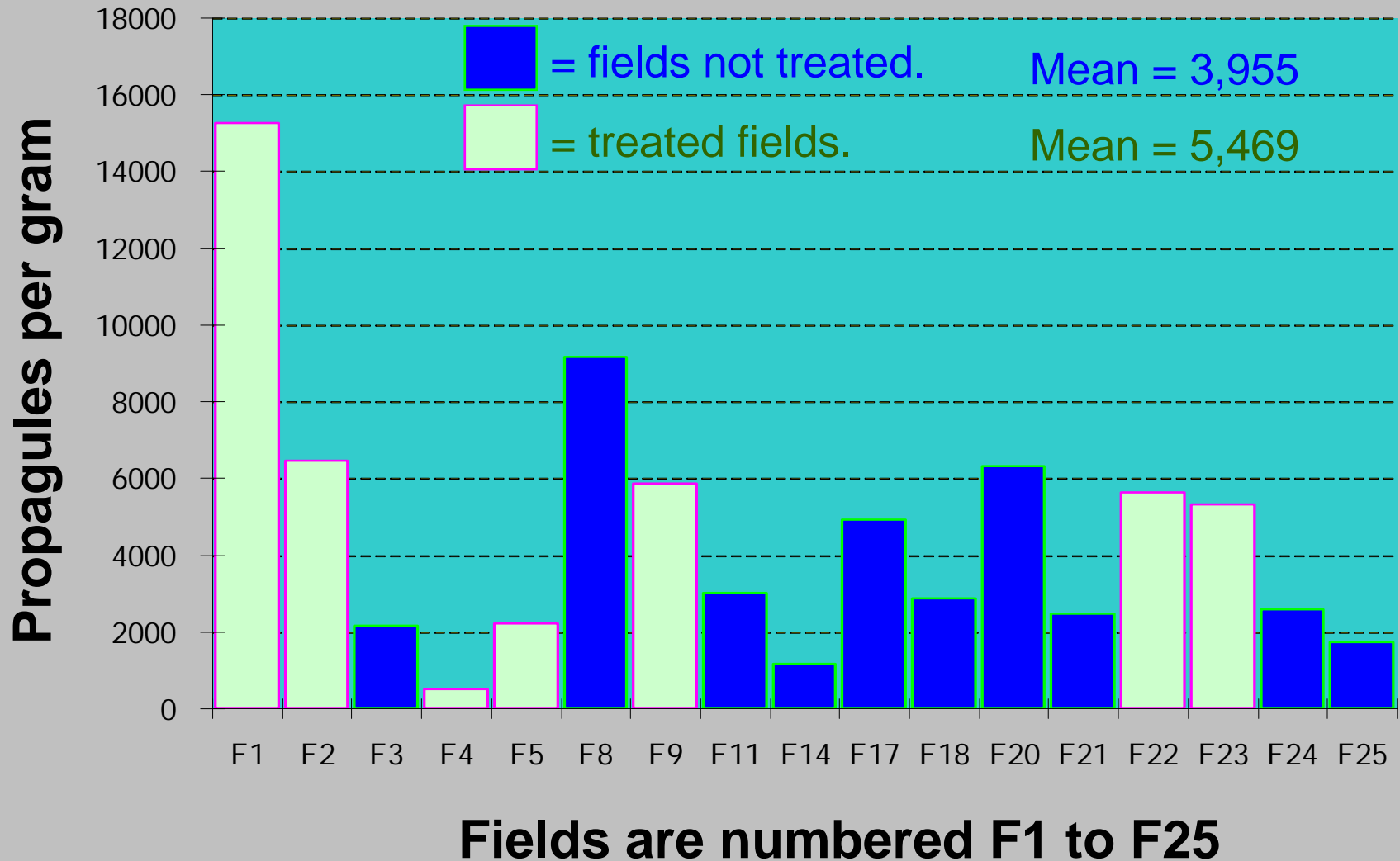
Desert Site	S Strain (% in desert)	Isolates (# from desert)	Distance to ag. (miles)	S Strain (% in ag.)	Isolate (# from ag.)
NE Welton	18%	1,422	1	39%	3,527
N Texas Hill	10%	1,039	3	60%	4,131
S Freeman	1%	141	15+	8%	383
SE Gila Bend	0	45	15+	36%	63
Organ Pipe Cactus National Monument	0	101	10+	not determined	not determined

Desert Values: Maria Boyd, unpublished results.

Welton & Texas Hill agricultural values from: Orum, *et al.* 1997. *Plant Disease* 81:911-916.

Freeman & Gila Bend agricultural values from: Cotty, P.J. 1997. *Mycological Research* 101:698-704.

Quantity of *Aspergillus flavus* Propagules on Cottonseed from Fields Treated with AF36 and from Fields Not Treated



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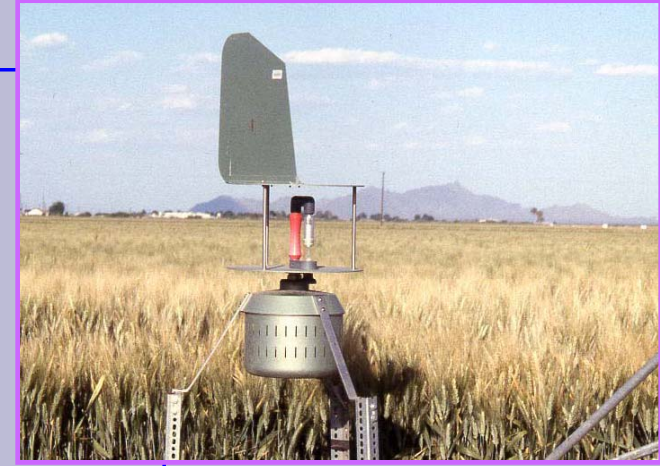
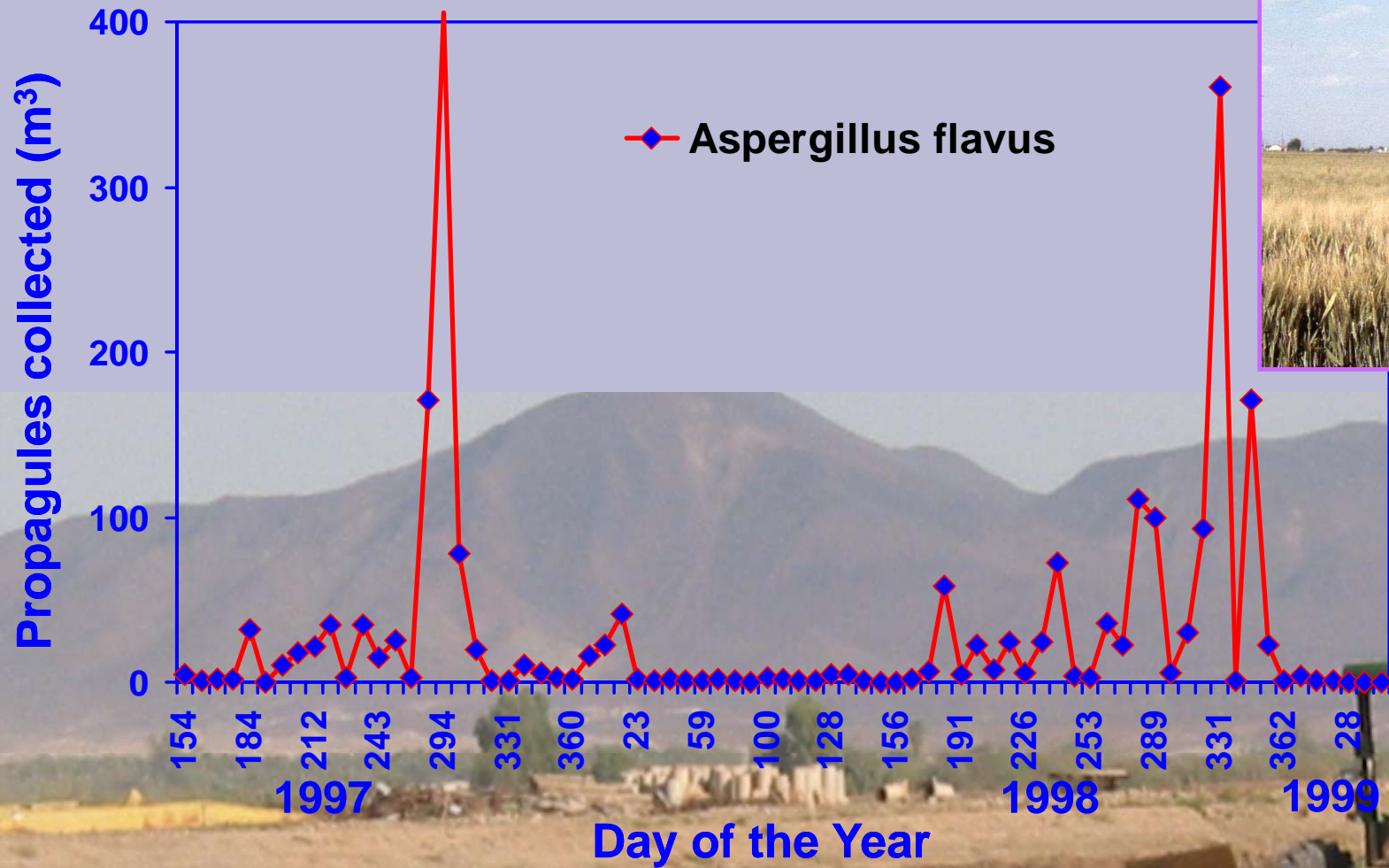
Adjacent

Diagonal

Other

Other

A. flavus is Common in Air of the Sonoran Desert



Bock, Mackey, & Cotty, 2004.
Plant Pathology 53, 422-433.



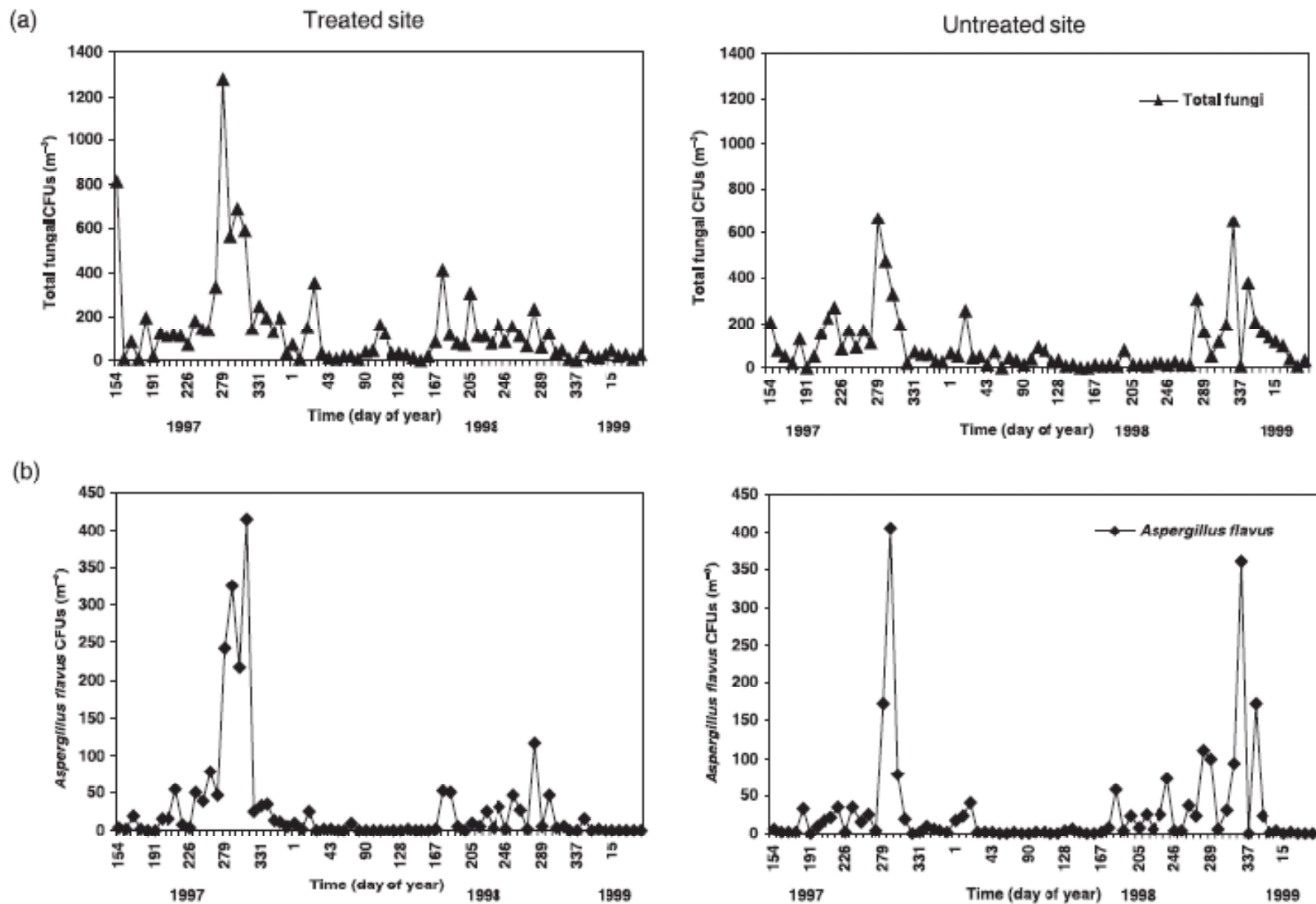
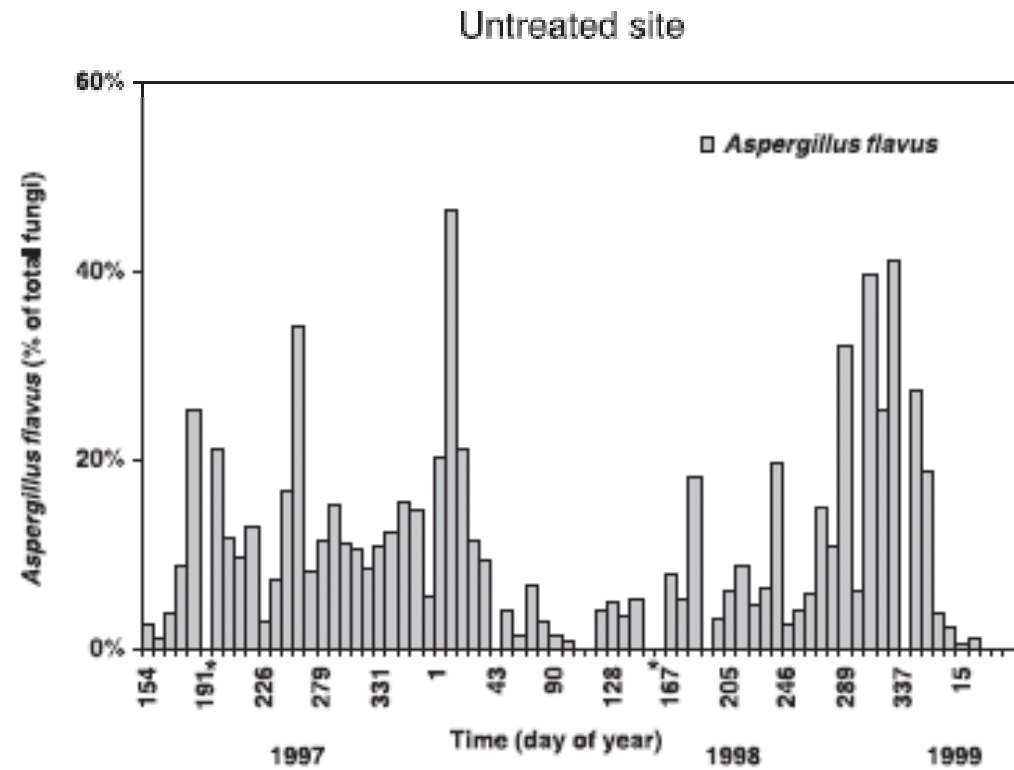
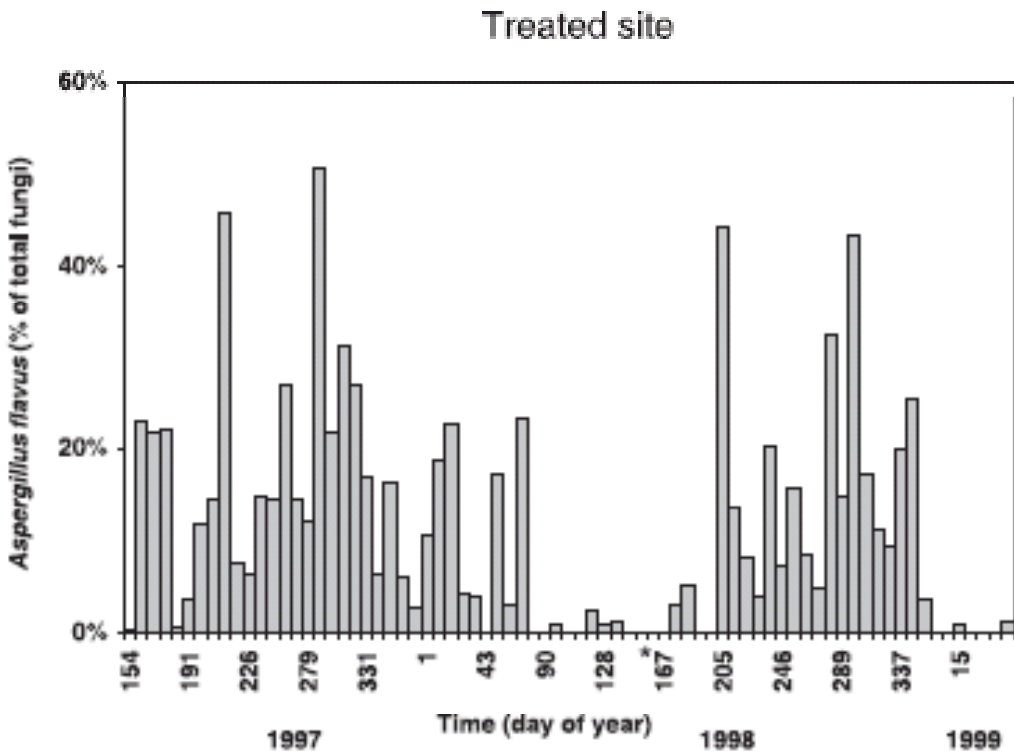


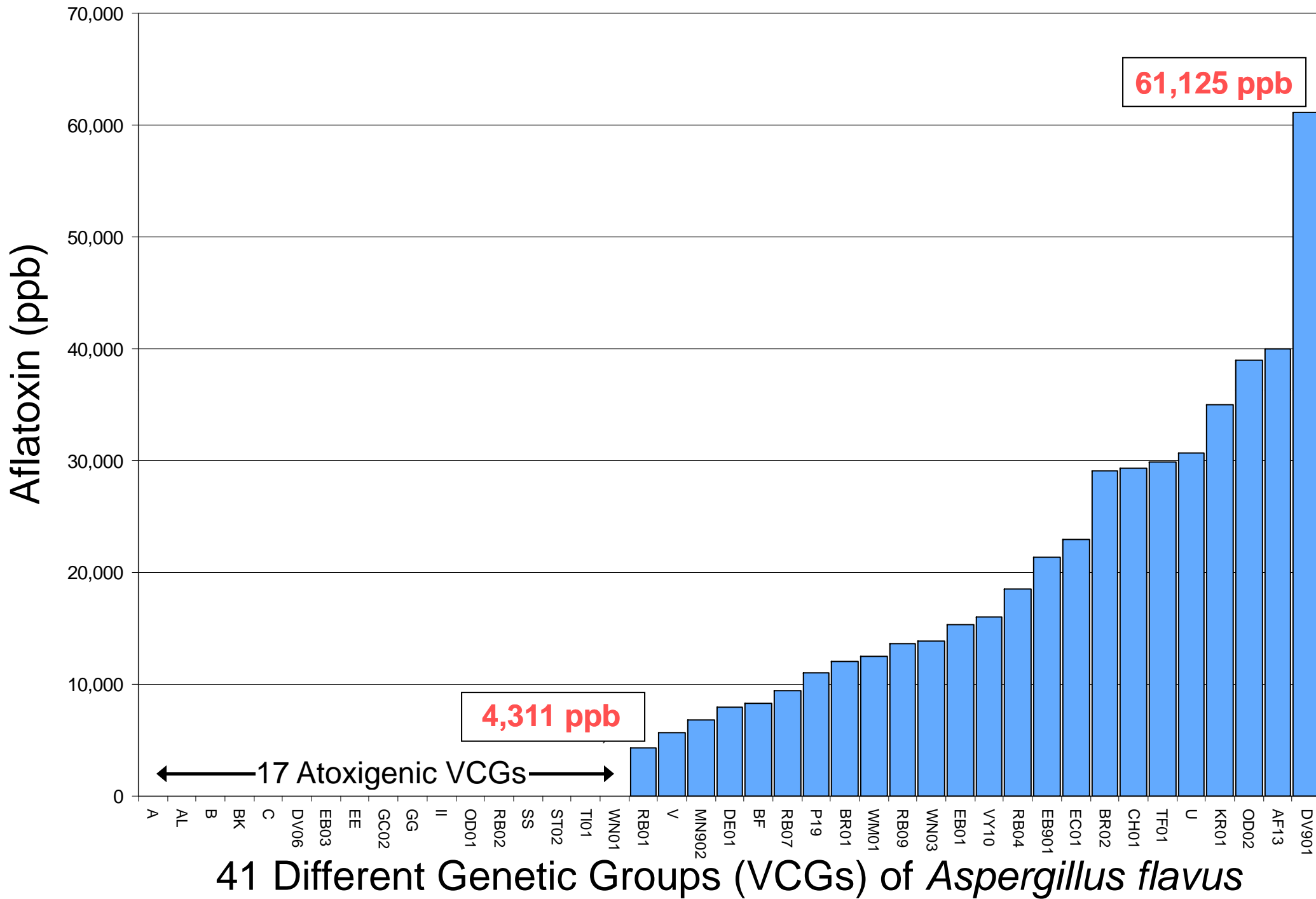
Figure 2 Quantity of (a) total fungi, and (b) *Aspergillus flavus* collected by Burkard cyclone samplers at a site treated with an atoxigenic strain of *A. flavus* and at an untreated site.



A microscopic image of a mold colony. The colony has a central, vertical stem that branches out into a large, dense, spherical head. The head is composed of numerous small, dark, rounded spores. The background is a light, textured surface.

Spores are not all equal!

Aflatoxins are concentrated in spores.



Pink Bollworm Eradication Plan in the U.S.

2. Detection

- Density.....One Trap/10 Acres
- Position.....On Field Perimeters
- Inspection Intervals.....Weekly
- PheromoneBi-weekly



Pink Bollworm Eradication Plan in the U.S.

3. Control

1. Hand-Applied High Rate



PB-Rope®

- Cultural Practices
- Bt Transgenic Cotton
- Mating Disruption (Pheromone)
- Sterile PBW Moth Releases
- Limited Insecticide