UK COOPERATIVE EXTENSION SERVICE
University of Kentucky – College of Agriculture

LEXINGTON, KY 40546

CORN AND SOYBEAN SCIENCE GROUP NEWSLETTER

Cooperating Departments: Agronomy, Agricultural. Economics, Biosystems and Ag. Engineering, Entomology, Plant Pathology
Morris Bitzer, Department of Agronomy, Editor

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Grain Crops and Soils Specialists were hired on July 1, 2002 in the Agronomy Department, College of Agriculture.

Grain Crops Extension Specialist: Dr. Chad Lee was hired by the Agronomy Department to fill the position of Grain Crops Extension Specialist at Lexington. Dr. Lee is a graduate of Berea College, received a Master's degree from the University of Nebraska, and just finished his Ph.D. at Michigan State University. He was raised on a farm in southern Ohio. Dr. Lee has a strong background in weed management with a couple of years experience with the Extension program in Michigan.

Soils Extension Specialist: Dr. Greg Schwab was hired to fill the Soil Management Extension Specialist position at Lexington. Greg is also a graduate of Berea College and from southern Ohio. Dr. Schwab received his Master's degree from Auburn University and a Ph.D. from Kansas State University. He served the past couple of years as the Dryland Soils Fertility Extension Specialist at Washington State University.

2003 Plant and Soil Science Field Day, Thursday, June 12, Spindletop Farm, Lexington: The Agronomy Department, will be sponsoring a Plant and Soil Science Field Day at Spindletop Farm, Lexington, Kentucky on June 12, 2003. This will be an outstanding educational event for Kentucky farmers that will combine, among the topics, field research, no-till equipment demonstrations and weed, insect and disease identification. It will be designed for full-and part-time farmers with afternoon and evening sessions. More details will be sent to you later, but **PUT THIS DATE ON YOUR CALENDARS NOW, THURSDAY, JUNE 12, 2003.**

Kentucky Corn and Soybean Production Contests for 2002: If you have not entered the corn and/or soybean production contests yet, it is not too late as long as you still have crops left in the field. If you had an NCGA corn entry, be sure that your local county extension agent gets that entry sent into the State contest. Don't forget that a double-crop soybean division has been added to the soybean contest. Your county extension office should have the proper forms for entering these contests.

TESTING CORN FOR MYCOTOXINS

by Paul Vincelli, Extension Plant Pathologist and Gary Parker, Extension Swine Specialist

Hot, dry weather during and following silking may have enhanced the risk of mycotoxin contamination in corn in many areas. Fusarium ear rot—the ear rot associated with fumonisin contamination—was diagnosed in western Kentucky, and areas in southwestern Illinois are reporting high levels of aflatoxins in some fields.

For producers and agricultural professionals who wish to test corn for mycotoxins, the following laboratories and test kits would be of interest. Given the weather this season, of particular concern to Kentucky producers would be analyses for aflatoxins and fumonisins.

Sampling Corn For Testing
The most important thing for a good test is to take a representative sample. Sample shelled corn using a grain probe or grab fistfuls from a moving stream. Don't collect a sample just from the most convenient place, like the top of the truck or storage bin. The odds are good that this will give a misleading result.

Take at least ten probefuls and collect at least 10 lb of corn. The corn must be below 16% moisture, unless the test is being performed immediately. Test results from high-moisture corn may not be accurate if the test is delayed, as the fungus can continue to grow and produce mycotoxins. Grind the sample and mix it well before drawing a small subsample for testing. The Association of Official Analytical Chemists requires that the entire 10-lb sample be ground to pass through a No. 14 sieve (about the texture of ground coffee) and mixed. A 2- to 4-lb sub-sample of this can be sent for testing.

Laboratories
Contact your laboratory of choice before sending samples.

A & L Laboratories
411 North Third St.
Memphis, TN 38105
(901) 527-2780
(800) 264-4522

Iowa Testing Laboratories, Inc.
Highway # 17 North
P.O. Box 188
Eagle Grove, IA 50533-0188
(515) 448-4741, Fax: (515) 448-3402

Breathitt Veterinary Center
Murray State University
P.O. Box 2000
715 North Drive
Hopkinsville, KY 42241-2000
(270) 886-3959
Fax: (270) 886-4295

UK Grain Quality Testing Lab
Attn: Michael D. Montross
Biosystems & Agricultural Engineering
128 Barnhart Bldg., University of Kentucky
Lexington, KY 40546-0276
Voice: (859) 257-3000 X106
Fax: (859) 257-5671, Email:montross@baeuky.edu

Commercial Test Kits for Detecting Mycotoxins
Rapid detection test kits are available for detecting mycotoxins. A list of commercially available test kits for the detection of fumonisin, vomitoxin (deoxynivalenol, DON) and zearalenone is provided below. Be sure the test used is approved by the USDA Grain Inspection, Packers and Stockyard Administration.

Test Kit	Manufacturer	Mycotoxin	Level of Detection (ppm)	Application	Approximate cost per sample	Equipment needed
Agriscreen	Neogen Corp.	DON	1.0	Screening	$6.00-7.00	Starter lab kit, up to $225
Veratox	Neogen Corp.	DON	0.1	Quantitative	$6.00-7.00	Microwell strip Reader, $1,875. Starter lab kit, up to $970
		Zearalenone	0.05	Quantitative	$6.00-7.00	(same)
		Fumonisin	0.2	Quantitative	$6.00-7.00	(same)
Mycotest	Romer Labs, Inc.	DON	0.5	Quantitative	$16.00	UV Lamp (long wave) $209
		Zearalenone	0.5	Quantitative	$16.00	(same)
Zearlatest	VICAM	Zearalenone	0.2-100	Quantitative	$10.00	Fluorometer $4,000
Fumonitest	VICAM	Fumonisin	5-10	Quantitative	$10.00	(same)

For more information on mycotoxins, see the UK Extension publications: ID-59, ID-121, PPFS-AG-C-3, PPFS-MISC-1

ARE CORN AND SOYBEAN YIELDS INCREASING?

by Dennis B. Egli, Department of Agronomy University of Kentucky

Are Kentucky corn and soybean yields increasing? Record average state yields in 2001 seem to suggest that they are. We expect lower yields in 2002, so maybe last year's records were just a result of exceptionally good weather and there is no upward trend. One way to find an answer to this question is to look at average state yields over many years, using yield estimates published by the Kentucky Agriculture Statistics Service. Over the past 61 years (1940 – 2001), it is clear that yields of both crops have shown steady improvement (Fig. 1) in spite of a lot of variation due to the weather. Yields of both crops were much higher in 2001 than they were in 1940, so yes, yields have increased. The trend is easier to see over a long period, because over short periods yields can be up, down or show no change, depending on weather conditions. For example, there was little improvement in yield of corn from 1976 to 1987 or of soybean from 1979 to 1989, but eventually good weather returns and the upward trend continues.

Producers sometimes feel that corn yields have increased more than soybean, and the data in Fig. 1 provide some support for this position. Corn yields increased by approximately 250% between 1950 and 2001, compared with an increase of only about 100% for soybean.

These increases in yield are a result of the availability of improved hybrids and varieties and better management techniques. The technology used to produce corn and soybean is constantly improving, but many scientists believe that more than 50% of the yield increase over time is a result of the work of plant breeders in developing better hybrids and varieties.

Is the yield potential of new hybrids and varieties still increasing or are we approaching a yield plateau? We evaluated the performance of the three highest yielding hybrids or varieties in the Kentucky Corn and Soybean Performance Tests to answer this question. These tests try to include all lines offered for sale in the state and are conducted at five to seven locations each year. The purpose of the tests is to provide an unbiased estimate of the production potential of the entries under weather and management conditions similar to those encountered in producer's fields. Consequently, none of the tests are irrigated. We averaged yields across all locations each year to provide an estimate of the performance of the best hybrids or varieties available. For soybean, we averaged the top three cultivars in each maturity group – early (group III), mid-season (group IV), late (group V) - to include varieties of the most common maturities used in Kentucky.

The yield of the top three lines varied widely from year to year as a result of variation in weather (primarily rainfall) at the test locations (Fig. 2). However, since 1985 a general trend for increasing yield in both crops is clearly superimposed on this variation. The yield of the top three corn hybrids never exceeded 200 bushels per acre before 1990, but it has been above that level three times since then. The yield of the best soybean varieties did not make it above 60 bushels per acre until 2000. These data suggest that hybrids and varieties are steadily improving, which means that producers who are using the same ones they used 3 or 5 or 10 years ago are losing potential yield and profit.

More importantly, the data provide no evidence of a yield plateau. The fundamental ability of a green plant to convert sunshine into stalks, stems, leaves, roots and seeds must eventually limit yield. But the yield level where this limitation will occur is vigorously debated by crop physiologists. Regardless of your opinion on how high this maximum yield is, the absence of a plateau in Fig. 2 suggests that the yield of our best genotypes is not close to this maximum.

The ratio between the yields of the best genotypes in the performance tests and the average state yields is an indicator of the relative rates of improvement in potential yield and what we are actually accomplishing in the field (Fig. 3). Much of the weather variation is removed from this ratio as both sets of yields are influenced by the same weather conditions. Of course, the yields of the best lines in the performance tests are higher than the state average (ratio is greater than 1.0), but, interestingly, the corn ratio trends downward with time, while there is no change in the soybean ratio (Fig. 3).

The corn ratio was about 1.8 in 1972 but it declined to about 1.4 by 2001. The abnormal spike in 1983 is the result of weather conditions that reduced the average state yields more than the variety test yields. The declining ratio, a result of average state yields increasing faster than the yield of the best hybrids, suggests that producers are steadily improving the management of their corn crop. This improvement probably comes from use of the best hybrids and management practices on a constantly increasing proportion of the corn acreage in Kentucky.

The soybean ratio, on the other hand, shows little change with time (Fig. 3). The average state yield of soybean has, over time, just kept pace with the yield of the best varieties, i.e., the ratio does not change. Apparently the average level of management applied to Kentucky's soybean crop has not improved over time like it has in corn. Soybean is a simpler crop to grow than corn, so there may be fewer opportunities for improving its management.

Future increases in corn and soybean yields in Kentucky will depend on the continued availability of improved hybrids and varieties and improvement in management practices. Seed companies have vigorous variety improvement programs in both crops, many of which include use of new biotech approaches to variety development, so there should be a continuous supply of higher yielding lines available to producers in the foreseeable future. Less effort, however, is devoted to the development of improved crop management practices as funding at public and private levels is diverted to more basic research areas. Consequently, yield increases from improved management practices may make a smaller contribution to increasing yields in the future.

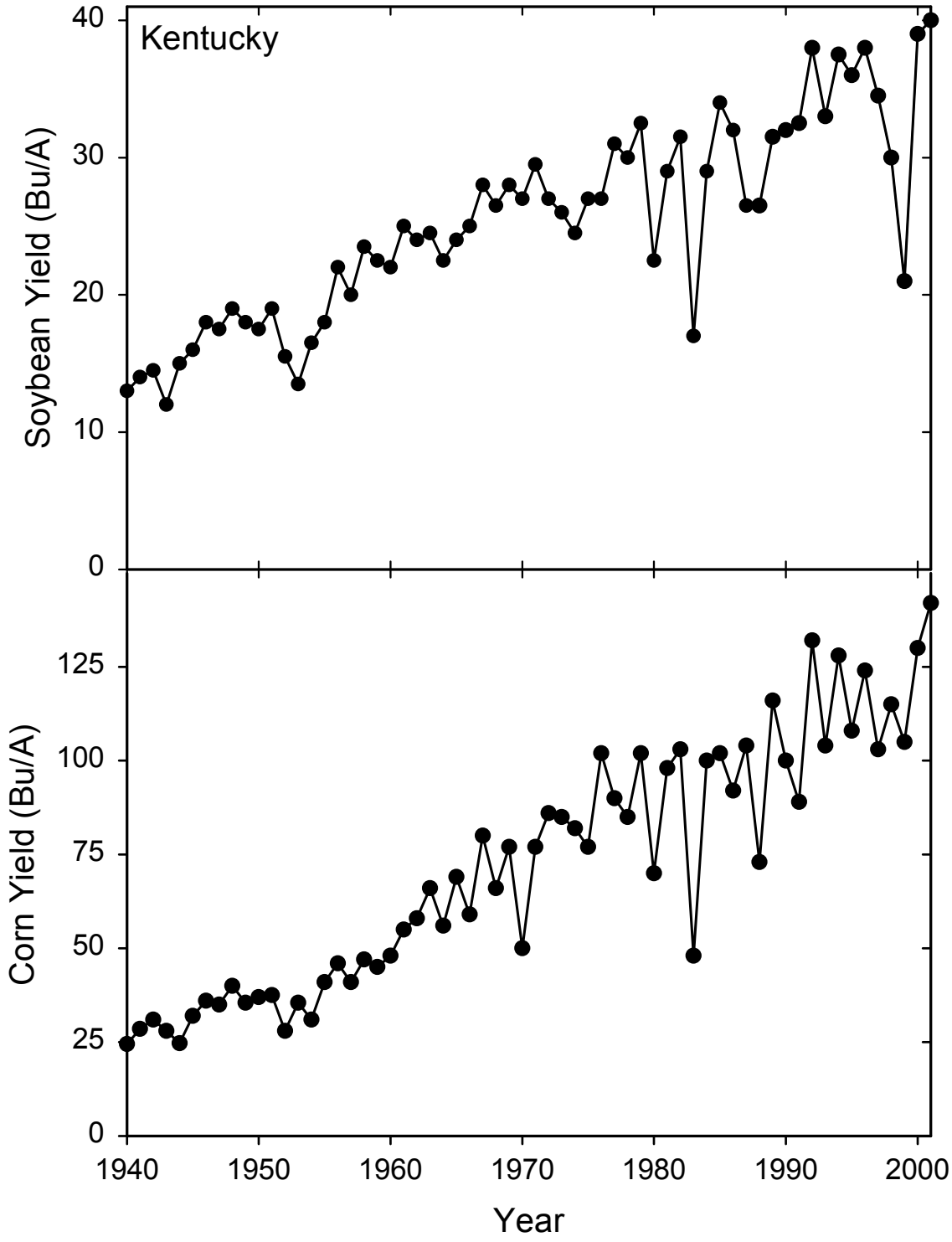

Fig. 1. Average state corn and soybean yields in Kentucky, 1940 – 2002 from the Kentucky Agricultural Statistics Service.

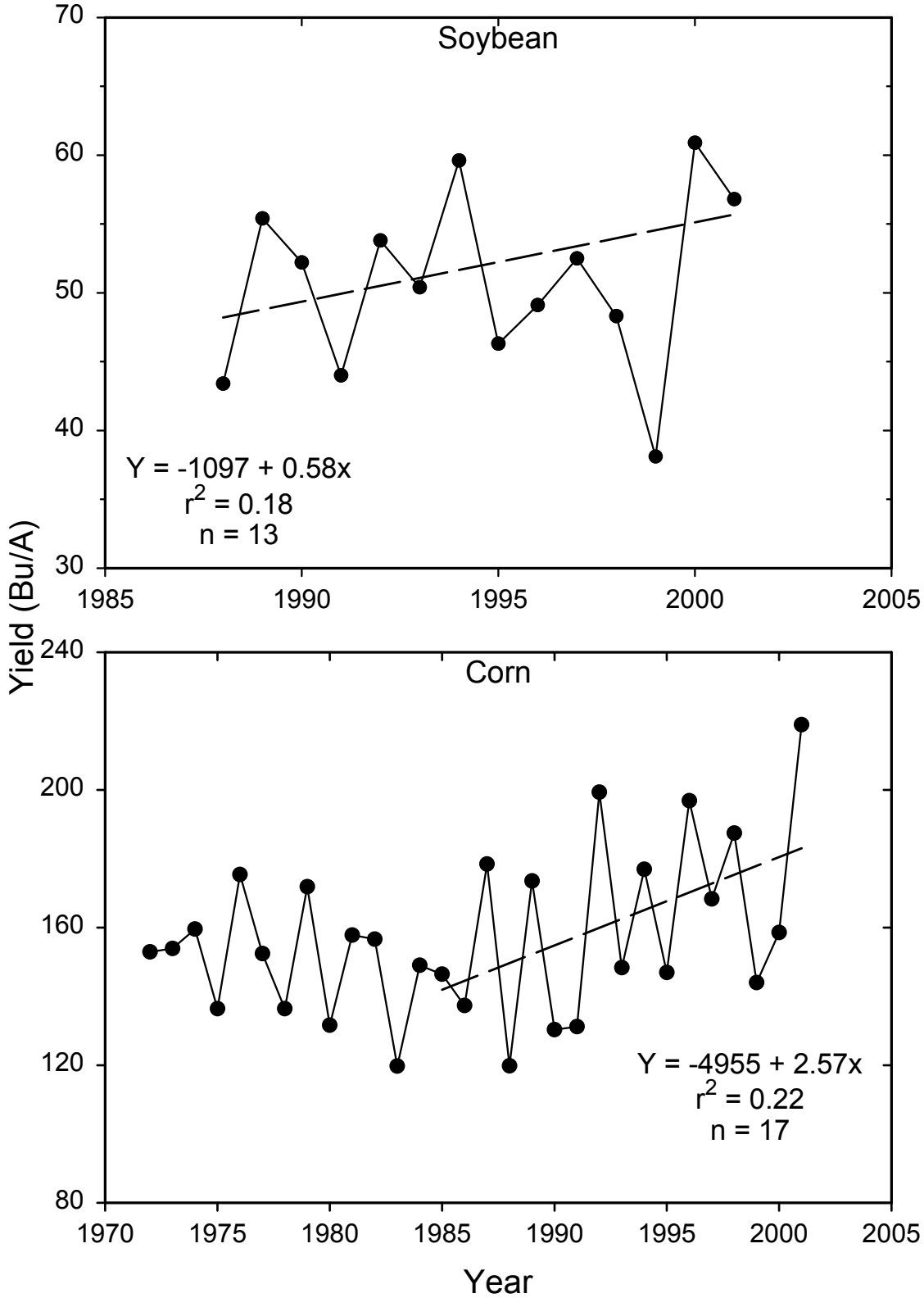

Fig. 2. Yield of the highest yielding hybrids and varieties in the Kentucky Corn and Soybean Performance Tests. Corn Yields are the average of the three highest yielding hybrids across locations. Soybean yields are the average of the three highest yielding varieties in each maturity group averaged across locations.

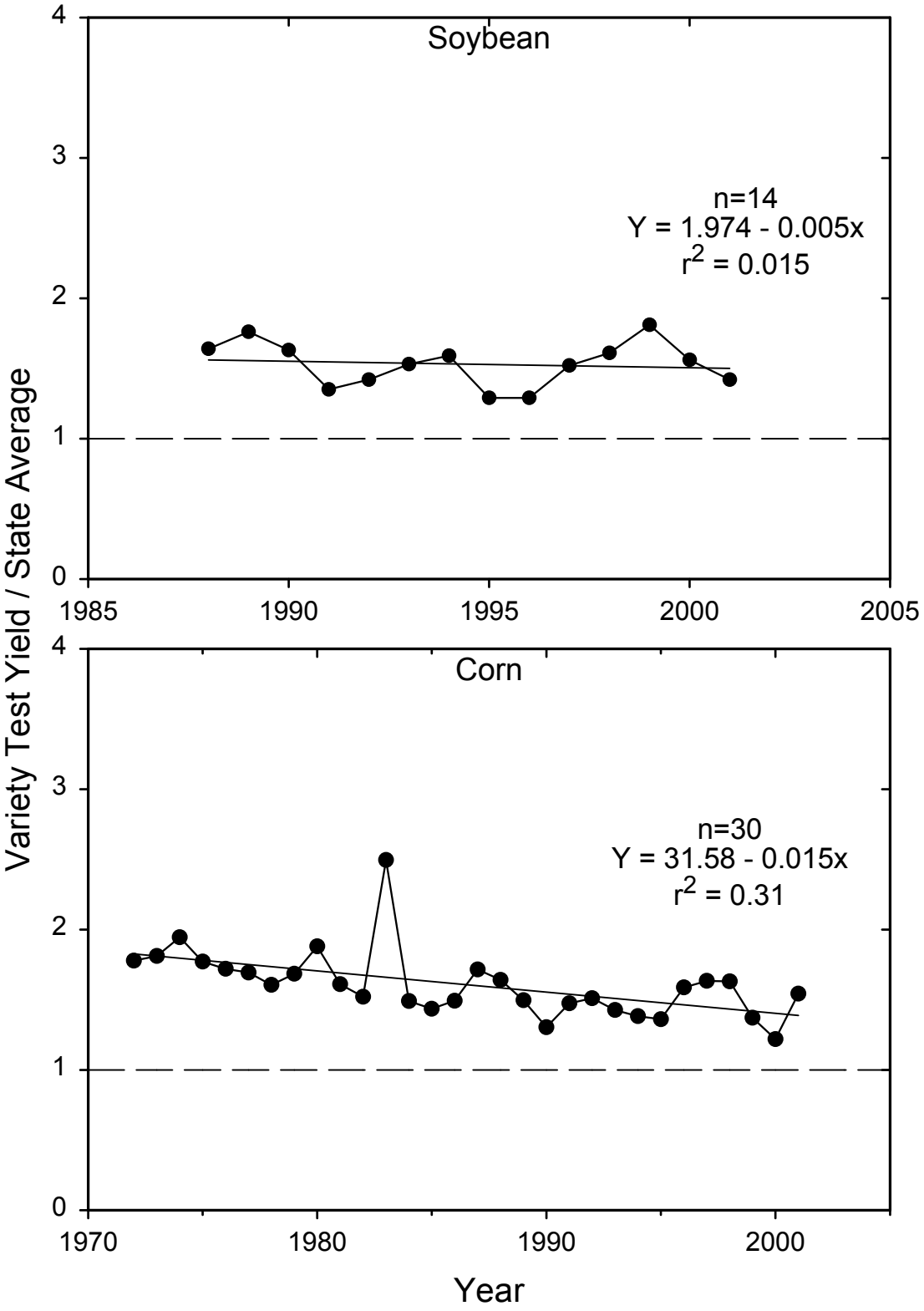

Fig. 3. The ratio of the yield of the best hybrids and varieties from the Performance Tests and the average state yield. Ratio=Yield of the best lines/state yield.

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