

OARDC EXTENSION

Introduction

The Ohio Corn Performance Test (OCPT) was initiated in 1972 by The Ohio State University OARDC and OSU Extension to evaluate hybrids marketed in Ohio for yield, harvest grain moisture, stalk lodging, and other important agronomic characteristics. Results of the OCPT can assist farmers in selecting hybrids best suited to their farming operations and production environments. The OCPT can offer insight into hybrid performance trends during the past 40 years.



To characterize changes in yield and other economically

The Ohio Corn Performance Test: 1972-2011

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Figure 5. Average % stalk lodging, OCPT 1972-2011 y = -0.108x+222 R2 = 0.043 P = 0.205 y = -0.108x + 222R2 = 0.043 P = 0.205

Results & Discussion

•Average OCPT stalk lodging has been highly variable during the past 40 years.



 Since the late 1990's, the numbers of hybrids evaluated in the OCPT for multiple years has dropped sharply.

Year

Figure 2. Historical Ohio corn production, state vs. OCPT average yield, 1972-2011.



Figure 2. Historical Ohio corn produc

important hybrid performance parameters that have occurred in the OCPT during the past 40 years.

Materials and Methods

•Each hybrid entry in the OCPT is evaluated using three or four replications per site in a randomized complete block design. Each hybrid is evaluated at three or four sites with a region (Figure 1).

•Hybrids are planted with a commercial type planter adapted for plot planting. Each plot consists of four 30inch rows approximately 25 feet long.

•Fertilizer, herbicides and insecticides are applied according to recommended cultural practices for obtaining optimum grain yields.

•Unlike many state university corn trials, the OCPT has allowed seed corn companies to specify a final plant population and percent overplant for each hybrid entered.

•The average OCPT yield, % emergence, plant population, % stalk lodging, % grain moisture and test weight of hybrids tested over the past 40 years was regressed against time for possible trends. •Since 1972, average OCPT grain yields (OSU, 1972-2011) have increased at the rate of 1.7 bu A⁻¹ yr⁻¹ whereas average state yields (NASS, 2012) have increased at the rate of 1.8 bu⁻¹ yr ⁻¹.

•Average OCPT and state yields grain yields were 145 and 92 bu A⁻¹ in 1972 compared to 229 and 159 bu A⁻¹ in 2011.

•Higher OCPT yields can be attributed to more favorable production environments with improved drainage and higher soil fertility, and the use of best management practices, including the latest hybrid genetics, higher seeding rates, pest management, and crop rotation.



•Stalk lodging has ranged from 0 to 25% and usually averages less than 10%.

•Improvements in hybrid stalk quality and disease and insect resistance may have limited stalk lodging as average OCPT plant populations increased (Figure 3).



•This "turnover" in hybrids suggests a greater number of new hybrids in the test each year, which may be related to the introduction of new transgenic traits and different combinations of traits (Figure 9).



•The OCPT first evaluated transgenic hybrids in 1996.

•Transgenic hybrids containing insect and herbicide resistance now comprise more than 90% the of OCPT entries.

•The PROC REG procedure in SAS (SAS Institute Inc., Cary, NC) was used to fit the linear regression models, and was considered significant if the global F-test was significant at $\alpha = 0.05$. State yields and plant populations since 1972 were also considered in this analysis.

•Other hybrid characteristics that have been collected include plant and ear heights, grain oil, protein and starch content, disease ratings, and green snap (data not shown).



OCPT • Statewide

 Increasing OCPT and State plant populations are closely associated with greater yields.

•Since 1972, average OCPT plant populations have increased at a rate of 275 plants A⁻¹ yr⁻¹ compared to a rate of 250 plants A⁻¹ yr⁻¹ for the state average plant population (NASS, 2011).

•Average OCPT and state plant population were 23,700 and 18,100 plants A⁻¹ in 1972 whereas in 2011 plant population for the OCPT and state averaged 35,100 and 29,350 plants A⁻¹.



 Average OCPT grain moisture has decreased at a rate of 0.13% year⁻¹.

•Grain moisture content at harvest can be influenced by a number of factors including planting and harvest dates and various stress conditions. However, earlier maturing hybrid entries and improvements in grain drydown may have contributed to the decrease in average OCPT % grain moisture.



Average OCPT grain yields have increased more than 40% since 1972 and are closely associated with the changes in OCPT plant populations, which are nearly 50% greater than those of the 1970's.

>Increased OCPT plant populations have not resulted in greater average stalk lodging which may be attributed to improvements in hybrid stalk quality and insect and disease resistance.

>Average OCPT harvest grain moisture since 1972 has decreased and test weight increased which may be related to improved grain drydown and/or earlier maturing hybrid entries.

>Hybrid turnover since the late 1990's has increased with less than 50% of OCPT entries evaluated more than one year. This turnover coincides with greater numbers of transgenic hybrid entries.

Future evaluations of OCPT yield trends need to consider the role of climatic changes on hybrid performance over time.

•The Ohio Corn Performance Test is currently conducted at ten locations. The state is divided into three regions – Southwestern/West Central/Central, Northwestern and North Central/Northeastern

•The Southeastern/West Central/Central region contains four test sites; the Northwestern and North Central/Northeastern regions contain three test sites.



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We thank our farmer cooperators and OSU research station managers for their contributions to the OCPT. We are grateful for the assistance provided by Alex Lindsey for his assistance analyzing test data. •Since 1972, average OCPT % emergence has increased at a rate of 0.2% year⁻¹.

•The average emergence of hybrid entries in the OCPT has increased from 86% in 1972 to nearly 95% in 2011.

•Although abiotic and biotic stresses at planting affect emergence, the increase in emergence since 1972 may be related to improved seed quality of hybrid entries and use of more seed applied fungicides and insecticides. •Average OCPT test weight (lbs bu⁻¹) has increased at a rate of 0.01 lbs bu⁻¹ year⁻¹.

•The increase in test weight may be related to the same factors affecting grain moisture (Figure 6).



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