



Northeast Missouri Ag Connection

Your local link to MU for ag extension and research information
<http://agebb.missouri.edu/agconnection>

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Agricultural Productivity Growth in the U.S.

A common theme in agriculture is, “agriculture has changed a lot in my lifetime”. However, it is difficult to explain how agriculture has changed other than bushels and costs have increased. USDA released a new 70 page report in July 2015 titled *Agricultural Productivity Growth in the United States: Measurement, Trends, and Drivers*.

The research focused on the years 1948 through 2011. The ability of the farm sector to feed far more people today, while using less farmland than six decades ago, is attributed to increases in agricultural productivity. During this period of time, output more than doubled. Growth averaged 1.49% per year and inputs increased four percent per year. Soybean yields doubled (increased by 22 bu/acre) and corn yields increased fourfold (increased by 115 bu/acre). Labor productivity increased by nearly 16 times from 1948 to 2011.

The study showed slowing growth in crop yields in 1990 -2000, raising concerns about a possible productivity slowdown in the U.S. farm sector. Slower growth in productivity could affect food prices, food security and the environment.

Changes in input use: The study showed total input use changed very little over the six decades. The use of intermediate inputs (fertilizer and pesticides) increased significantly, while there was decreased use in land and labor. Over time, the prices of farm machinery, energy, chemicals, and purchased service inputs fell relative to the price of farm labor. The drop in relative input prices encouraged farmers to substitute chemicals, purchased services, energy, and machinery use for labor.

Changes in output: The output mix changed with the crop production sector growing faster than the livestock production sector. The prices of fruits, nuts and vegetables during this period rose relative to the prices of other crops. Poultry and eggs grew much slower in price than other livestock products. The shifts in consumer purchases may be the contributing factors to the movement in prices.

Also included in the report is a comparison of public versus private agricultural research. Public research and development investment dollars grew rapidly through 1980. Private research and development has been growing faster in recent years. The study included extension services and the dissemination of new technology. Extension full-time equivalent staffs declined nationally by 20% from 1980 to 2010 across the country. The study ran future models and found the decline in public dollars for research and development is not expected to have a large impact on agriculture in the short term (within 10 years); however, long term productivity will decline significantly by 2050 (the productivity measure used in the report moved from 1.42% to 0.86%).

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These are a few highlights from the report. The entire report can easily be found by searching the title online or visiting: <http://www.ers.usda.gov/media/1875389/err189.pdf>

Source: *Mary Sobba, Ag business Specialist*

Fruit Trees Struggle to Survive Wet Season

It has been a challenging year for most gardeners. Tomato plants look worse than they have in years. Spotted wing drosophila appeared six weeks earlier than last year in berry crops, and saturated soil has killed young trees.

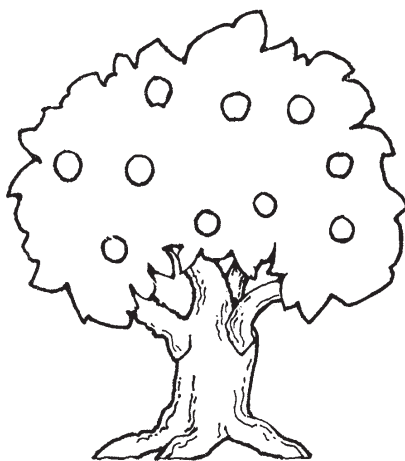
During a time of extended rainfall, the soil around young fruit and ornamental trees becomes saturated and reduces the amount of oxygen available to the root system. The atmosphere contains approximately 21 percent oxygen with soil concentrations significantly lower. If the oxygen level drops to less than 10-12 percent, plant roots suffocate and die. During times of excessive rainfall, soil pores filled with air become filled with water. Plants in standing water or very wet areas lose their lower roots where the oxygen concentration is initially lower. If water persists in the soil for a long period of time, the roots gradually die upward until only surface roots remain. As the number of roots dying increases, the likelihood of plant survival decreases once soil moisture conditions become more favorable. When the soil warms during the early spring, woody ornamentals begin to develop new roots. When the soil is saturated, these roots become oxygen-starved and die nearly as quickly as they are formed. These “feeder roots” are very important for the well-being of the plant. Trying to establish new trees and shrubs in the landscape, when the soil is continually wet, becomes a challenge.

Little can be done to prevent damage to plants from excessive rain. Incorporating approximately four inches of well-decomposed organic matter on an annual basis is considered to be a “best management practice” for garden soils. Gypsum (calcium sulfate) is a naturally occurring substance that can be used to improve soil. Gypsum causes soil structure to be more

sponge-like, causing water to infiltrate faster through the soil rather than “pond” or run-off. The end result is an increase in the amount of oxygen available to plants roots. Planting on berms is another way to deal with poorly-drained soils. A berm is a mound of soil with sloping sides. Rain is more likely to run off than to be absorbed by the soil.

Stone fruit trees tend to suffer the most during excessive rainfall. These include cherry, peach, plum and any other fruit with only one pit or seed. The first signs of stress are yellowing of the leaves and usually within a week the tree leaves are brown and the tree is beyond recovery. At the first signs of stress, young trees can be dug out of the ground and placed in large containers with potting mix or a lighter weight soil.

This gets the tree out of the wet soil and improve the chance for survival.



Pome fruits, like apples and pears, have survived the wet weather much better than the stone fruits. Many pome fruit trees are loaded with fruit this year and will be ready for harvest in September. Pears allowed to become too mature, or to ripen on the tree, develop a coarse, mealy texture and often have core breakdown. Determining when pears are ready to harvest is tricky. If they are left on the tree too long, many of the

fruits will become overripe and fall to the ground. This results in soft bruised pears that do not keep well. Pick pears before they mature and let them ripen off the tree in a cool place before consuming. Handle pears carefully while harvesting and place them into storage. Bruised fruit does not store well. Pears should be stored in a cool humid location such as the refrigerator. Properly storing pears immediately after picking will increase storage life. Apples picked too early are likely to be sour, small and poorly colored. If picked overripe, they may develop internal breakdown and not store well. Apples to be stored, should be picked when showing a mature skin color with a hard flesh.

For more information on home fruit production visit the University of Missouri Extension website at <http://extension.missouri.edu> and click on lawn and garden at the top of the page, or call your county extension center.

Source: *Jennifer Schutter, Horticulture Specialist*

Feeding DON (vomitoxin) Infected Wheat to Livestock

The wet weather this spring and summer has been difficult for producers and certainly has affected crop production. The wet weather hampered not only soybean planting and corn growth, but also adversely affected the wheat crop. In addition to muddy fields, wheat producers had to contend with deoxynivalenol (DON), commonly referred to as vomitoxin. Vomitoxin is a mycotoxin produced in wheat and barley infected by Fusarium head blight (FHB) or scab due to extremely wet weather during the flowering and grain filling stages of plant development. According to North Dakota State University (NDSU), the occurrence of FHB does not automatically mean DON is present, but a high level of scabby kernels in harvested grain indicates DON could be present. Levels of DON do not necessarily correlate with levels of physical damage in grain.

DON in grain is expressed as parts per million (ppm). One ppm is equivalent to 1 pound in 1 million pounds, 1 penny in \$10,000, 1 minute in 2 years or 1 wheat kernel in 80 pounds of wheat. Unlike aflatoxin in corn, DON is not a known carcinogen. Grain with DON would have to be ingested in very high amounts to pose a health risk to humans, but it does affect food flavor and processing performance.

DON does cause feed refusal and poor weight gain in some livestock if fed above the advisory levels as stated in the chart below sourced from the Federal Drug Administration (FDA) as published by NDSU:

Intended use	Grain and by-products	DON (vomitoxin) levels	Notes	Total PPM in ration
Human Consumption	Finished wheat products, such as flour bran and germ	1 ppm	FDA does not set an advisory level for raw grain intended for milling	1 ppm
Swine	Grain and by-products	5 ppm	Providing these ingredients do not exceed 20% of diet	1 ppm
Chickens	Grain and by-products	10 ppm	Providing these ingredients do not exceed 50% of diet	5 ppm
Ruminating Beef & Feedlot Cattle	Grain and grain by-products*	10 ppm	>4 months of age	10 ppm
Ruminating Dairy Cattle	Grain and by-products*	10 ppm	>4 months of age	5 ppm
Other Animals (lactating dairy cattle in earlier references)	Grain and by-products	5 ppm	Providing these ingredients do not exceed 40% of diet	2 ppm

Note: Assuming 88% dry matter and excluding distillers/ brewers grains and gluten/gluten meals which can contain 30 ppm vomitoxin on an 88% dry matter basis

Beef Cattle: Research conducted in North Dakota and Minnesota has suggested growing and finishing cattle can tolerate higher levels of DON (up to 18 ppm based on research).

Dairy Cattle: FDA limits the level to 2 ppm DON in the diets of lactating dairy cows.

Swine: Do not feed wheat containing DON to gestating or lactating sows or pigs weighing less than 50 lbs. Growing and finishing pigs may be fed grains containing DON, provided the level of it in the diet does NOT exceed 1 ppm.

Poultry: Poultry can be fed grain containing DON, but total dietary levels should not exceed 5 ppm (10 ppm DON in wheat could be fed at 50% of the diet).

Horses: No research data exists evaluating feeding grain containing DON to horses; however, horse owners should be extremely cautious about feeding DON containing grain to horses.

Straw from DON contaminated wheat could have issues as well. According to University of Illinois wheat straw can contain over 2 ppm of DON, even if fungicides were sprayed during the growing season, and Dr. Tim Evans from the MU Veterinary Medical Diagnostic Laboratory (MU VMDL) reports that they have even seen vomitoxin concentrations exceeding 10 ppm in wheat straw. Therefore, the same precautions recommended for scabby grain also apply to wheat straw. Testing of both wheat grain and wheat straw for vomitoxin is recommended before feeding to livestock or using for bedding or silage.

Dr. Evans says that testing feedstuffs for vomitoxin during years like 2015 is highly recommended. However, the same

fungus which produces vomitoxin can simultaneously also produce zearalenone, an estrogenic fungal metabolite that can have negative effects on the reproductive potential of young developing beef heifers and, especially, prepubertal gilts. Evans suggests doing a *complete mycotoxin screen in feedstuffs, which costs \$75.00* and tests for aflatoxin B₁, ochratoxin A₁, vomitoxin (DON) and zearalenone, might be more economical and accurate assessment of a feedstuff's contamination with mycotoxins, than just testing for vomitoxin, which costs \$51.50 at the VMDL.

For more information:

2015 MU Weather site:

<http://tinyurl.com/weatherMU15>

MU VMDL testing/fee services:

Page 17 contains details on tests.

<http://tinyurl.com/vetmedMUList>

Source: Wendy Flatt, Livestock Specialist

Lots of Hay this Year, but How Good is it?

Rain, rain, and more rain, that is what Missourians saw during the summer of 2015. All one has to do is drive past the unplanted soybean fields to understand what kind of summer it has been. The abundance of rain has delayed hay harvest which has increased tonnage but has decreased forage quality so adding a supplement this winter may be necessary.

Now is the time to test hay to determine what the winter feed needs will be, especially for producers with a fall calving herd since peak lactation will occur in the middle of winter. Winter is only a few months away, so now is the time to prepare. Booking supplements now will help producers save money.

Most extension offices have access to a hay probe and can send samples to an accredited laboratory in Missouri or to other surrounding states and get a snapshot of the quality of hay. MU Extension livestock specialists can help producers balance rations utilizing by-products potentially reducing costs and maintaining productivity. Producers need to be wary of the hay supply this winter. The most economical method to determine forage quality is utilizing a hay test.

Source: *Wendy Flatt, Livestock Specialist*

