

Statistical Methodology

Name of Survey: Postharvest Chemical (PHCUS), 2009-2010 marketing year.

Name of Summary: Agricultural Chemical Usage 2009-2010 Wheat Postharvest Summary
(Access at USDA-NASS Quick Stats: <http://quickstats.nass.usda.gov/>. See Sector: Environmental, Group: Field Crops)

Data Collection Period: July to September 2010

Sample Size, Sampling Frames and Methods:

The 2010 Postharvest Chemical Use Survey targets individual grain elevators who reported having wheat stocks during the time period between June 1, 2009 and May 31, 2010 in Colorado, Idaho, Kansas, Minnesota, Missouri, Montana, Nebraska, North Dakota, Ohio, Oklahoma, Oregon, South Dakota, Texas, and Washington. The final 2009-2010 PHCUS sample consisted of 2,237 off-farm operations.

The stratified sample was selected from the individual elevators on the NASS quarterly off-farm grain stocks list. The sample was stratified by individual elevator capacity. The strata definitions were the same across all the Program States. A systematic approach was used to ensure coverage for all individual elevators within multiple unit operations.

Sample Unit and Reporting Unit: The sample units were individual and multi-unit operations.

Modes of Data Collection: Personal and phone interview

Selected Terms and Definitions:

Active Ingredient: The specific pesticide ingredient which kills or controls the target pest(s) or other target material(s), or otherwise results in the pesticide effect(s). All pesticide-use estimates in the report are at the active ingredient level; one or more active ingredients are present in known amounts in the pesticide products reported in survey.

Estimates of active ingredient use were reported in a single unit of equivalence, per ingredient. For salt, ester, or amine active ingredients, estimates were reported in the parent acid equivalents. For example, the acid derivatives glyphosate isopropylamine salt and 2,4-D, 2-ethylhexyl ester were reported in the glyphosate and 2,4-D equivalents, respectively. For copper compounds, estimates were reported in the metallic copper equivalent.

Active Ingredient Code: A unique code assigned to each active ingredient upon registration with the Environmental Protection Agency's Office of Pesticide Programs, to facilitate pesticide regulation.

Aeration controller: An automatic (usually computer-based) system that determines the optimum running time for aeration fans on the grain storage units based on humidity and temperature. They can usually be set for drying or storage mode.

Core bins after filling: When grain is placed into a bin, it is usually filled from the top. Smaller particles, called fines, tend to concentrate in the center of the bin. This material compacts, restricting airflow which in turn affects grain temperatures and thus pests. For this reason, it is recommended that a portion of grain be extracted from the bottom center of the bin. This core can then be reloaded onto the top and spread over the surface to distribute the fines evenly.

Deep bin sampler: Usually a vacuum type device that can extend deep into a grain bin and sample grain that is normally out of reach to typical probe samplers.

Direct powdering: Usually applying a fungicide or insecticide that is a powder or dust directly on the grain.

Fumigant: A substance or mixture of substances which produce a gas vapor, fume, or smoke intended to destroy insects, rodents, or bacteria.

Grain spreader: When grain is loaded into the grain bin, it can first be put through a device that disperses the grain out from the fall line and fills the bin uniformly rather than forming a cone in the center of the bin.

Marketing year: Refers to the period immediately following harvest of the crop through the marketing or disposition of the crop.

Mixing pellets/tablets: A pesticide application method in which the grain is mixed with pellets or tablets. The pellets or tablets contain phosphine (aluminum phosphate) and form a gas. Phosphine is used as an insecticidal fumigant.

Number of Applications: The average number of times a treated unit (1,000 bushels) received a pesticide active ingredient. (*In Quick Stats: Applications, Measured in Number*)

Pesticides: Defined by the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) as “(1) any substance or mixture of substances intended for preventing, destroying, repelling or mitigating any pest, (2) any substance or mixture of substances intended for use as a plant regulator, defoliant, or desiccant, and (3) any nitrogen stabilizer...(*Title 7, U.S. Code, 136*).” Under FIFRA, pesticides are registered and regulated through the Environmental Protection Agency’s Office of Pesticide Programs. Three classes of pesticides are included in the report: (1) insecticides targeting insects (2) fungicides targeting fungi, and (3) other chemicals targeting all other pests or other materials.

Postharvest: After the commodity is harvested from the field, any subsequent activity is termed postharvest. Postharvest chemical usage refers to chemical applications after the commodity is taken from the field.

Phosphine pellet dispenser: A device which manually or automatically dispenses phosphine pellets to a stream of grain as it is loaded.

Power probe: A fully integrated mechanized system for sampling stationary lots of grain in trucks or other conveyance. This device obtains a representative sample by inserting a probe into the grain, opening the probe to allow grain to enter, closing, and then the sample is pneumatically withdrawn from the probe.

Processor: Operations that change the form of the commodity. These operations may have storage facilities as well.

Protein analyzer: Usually infrared analyzers that can, within a matter of minutes, determine the composition of the grain. Values obtained can include protein, oil, starch content, moisture content, and kernel density.

Rate per Marketing Year: Ratio indicating pounds (lbs) of pesticide active ingredient applied, counting all applications per marketing year, per 1,000 bushels. (*In Quick Stats: Applications, Measured in Lb/1,000 bushels/Year*)

Re-circulation fumigation device: A fan that is combined with PVC pipe on the outside of a grain or potato storage unit. The PVC runs from the top, down the sides, through the fan, and into the bottom of the grain storage unit. Rather than probing fumigant pellets into the grain mass from the surface of the grains, you can use a much lower concentration of fumigant and place the pellets in the PVC pipe from outside of the grain storage unit. Advantages include using less chemical, increased worker safety and more uniform distribution of the gas since the fans force the fumigant throughout the grain mass.

Temperature cable: Cable running from top to bottom in a storage unit that automatically measures grain temperature and outputs this information to a central system.

Top Dress: Spraying the top of the grain with a pesticide product. The primary goal is to treat the space between the top of the grain and the top of the bin for insects.

Rate per Application: Ratio indicating pounds (lbs) of a pesticide active ingredient applied, per single application, per 1,000 bushels. (*In Quick Stats: Applications, Measured in Lb/1,000 bushels/Application*)

Volume handled: The amount of a commodity handled by the market segment. Volume handled is the total amount of a commodity that passed through the firms in the state.

Volume treated: The percentage of volume handled which received one or more applications of a specific agricultural chemical. (*In Quick Stats: Treated, Measured as Percent of Volume*)

Data Review and Estimation Procedures: The 2009-2010 wheat postharvest chemical usage estimates were based on data collected, reviewed, and verified through the cooperative efforts of the USDA-NASS Environmental and Demographics Section and Program-State Field Offices.

NASS maintains chemical use databases which contain product recommended use ranges and active ingredient concentrations per product. These databases are used to review pesticide product usage data and to convert pesticide product usage data to the equivalent active ingredient levels for publication. Review and finalization of all data proceeded with assessment of reasonableness and consistency at the record, State, and U.S. levels.

Some products are labeled for control of pests across pesticide classes; for example, as an insecticide and as a fungicide. In these instances, the active ingredient is listed under the pesticide class for which it is predominately used.

Reliability: Estimates were subject to sampling variability; sampling variability was measured by the coefficient of variation (cv), expressed as a percent of the estimate. Coefficients of variation differed considerably by variable and chemical. The narrower the numerical range of responses per variable and the larger the number of positive responses per variable, the smaller the sampling variability. For these reasons, cv's were generally lower for active ingredient *Rate of Application* estimates and for estimates associated with the most often reported active ingredients. For example, estimates of a commonly used active ingredient such as aluminum phosphide will exhibit less variability than a rarely used chemical such as carboxin.

Estimates were additionally subject to non-sampling errors. Non-sampling errors result when the target population is mis-defined through list duplication or incompleteness, or sample unit data are mis-recorded through mistakes in reporting, recording, or processing the data. Strict quality controls implemented at each step of the survey and data review process minimized the occurrence and magnitude of non-sampling errors.

Revision Policy: Estimates are final at first release, and are not subject to revision.