

BARLEY

CHEMICAL USAGE

2003

Agricultural Chemical Usage 2003

The agricultural chemical use estimates in this report refer to on-farm use of commercial fertilizers and pesticides on the targeted crops for the 2003 crop year. Farm and ranch

operators were enumerated late in the growing season or after the farm operator had indicated that planned applications were completed.

Barley: Fertilizer Use by State, 2003 Percent of Acres Treated and Total Amount Applied

State	Planted Acreage	Percent of Acres Treated and Total Applied					
		Nitrogen		Phosphate		Potash	
	1,000 Acres	Percent	Mil. Lbs	Percent	Mil. Lbs	Percent	Mil. Lbs
CA	100	72	5.2	32	0.6	2	0.0
ID	750	91	56.2	58	15.4	25	5.7
MN	190	91	11.4	87	5.6	66	4.0
MT	1,100	92	44.2	88	30.2	52	9.7
ND	2,050	98	116.5	91	50.7	20	4.2
PA	75	69	2.2	39	1.1	40	1.2
SD	75	82	2.6	78	1.9	13	0.2
UT	45	58	2.1	14	0.3	0	0.0
WA	320	99	22.5	58	2.5	8	0.5
WI	55	37	0.5	36	0.7	44	1.8
WY	90	78	7.3	60	2.4	22	0.7
Total	4,850	93	270.7	79	111.4	29	28.0

Barley: Pesticide, Total Acreage, Percent of Area Receiving Applications and Total Applied, States Surveyed and Total, 2003

State	Planted Acreage	Area Receiving and Total Applied							
		Herbicide		Insecticide 1/		Fungicide 3/		Other Chemicals 3/	
	1,000 Acres	Percent	1,000 Lbs	Percent	1,000 Lbs	Percent	1,000 Lbs	Percent	1,000 Lbs
CA 1/	100	67	32						
ID 1/	750	94	573	3	16			5	9
MN	190	89	88	8	3	39	9		
MT 1/	1,100	93	1,005	2	5				
ND	2,050	98	1,067	4	11	11	20		
PA	75	32	8						
SD 1/	75	86	34						
UT 1/	45	75	17						
WA 1/	320	94	358						
WI	55	21	5						
WY	90	83	57	10	2/				
Total	4,850	93	3,249	3	41	7	7	1	31

1/ Insufficient reports to publish data for one or more of the pesticide classes. 2/ Total applied is less than 500 lbs.

Survey, Estimation Procedures, and Reliability

Data for barley, corn, fall potatoes, sorghum, and upland cotton were collected on the 2003 Agricultural Resources Management Survey (ARMS) during the months of August through December 2003. Large screening samples were drawn from the NASS List Sampling Frame. This extensive sampling frame covers all types of farms and accounts for approximately 82% of all land in farms in the U.S. All farms on the list had a possibility of being selected for the screening sample. Farms thought to have the crops of interest were more likely to be in the screening sample. Sampled farms were screened to determine if they grew the target crops in 2003. From this subpopulation of operations identified as producing a crop of interest, a subsample of farms was selected in such a way as to insure that each identified producer had an opportunity to be selected. In general, larger farms were more likely to be selected than smaller farms. Once a farm producing barley, corn, fall potatoes, sorghum, or upland cotton was selected, one field was randomly selected from all the fields on the farm. The operator of the sampled field was personally interviewed to obtain information on chemical applications made to the selected field.

Estimation Procedures: The chemical application data, reported by product name or trade name, are reviewed within each State and across States for reasonableness and consistency. This review compares reported data with manufacturers' recommendations and with data from other farm operators using the same product. Following this review, product information is converted to an active ingredient level. The chemical usage estimates in this publication consist of survey estimates of those active ingredients. For this publication, detailed data within a table may not multiply across or add down due to independent rounding of the published values.

Estimates of the total amount of active ingredient applied are based on the acreage estimates published in the annual NASS report "Crop Production - 2003 Summary" [Cr Pr 2-1(04)] for barley, corn, fall potatoes, sorghum, and upland cotton. Please note that the estimates for total amount of an active ingredient applied will not be revised even if there are subsequent revisions to acreage for a given crop.

Reliability: The surveys were designed so that the estimates are statistically representative of chemical use on the targeted crops in the surveyed States. The reliability of these survey results is affected by sampling variability and non-sampling errors.

Since all operations producing the crops of interest are not included in the sample, survey estimates are subject to sampling variability. The sampling variability expressed as a percent of the estimate is called the coefficient of variation (cv). Sampling variability of the estimates differed considerably by chemical and crop. Variability for estimates of acres treated will be higher than the variability for estimates of application rates. This is because application rates have a narrower range of responses, are recommended by the manufacturer of the product, and are generally followed. In general, the more often the chemical was applied, the smaller the sampling variability. For example, estimates of use of a commonly used product, such as

atrazine, will exhibit less variability than a more rarely used product. For more commonly used chemicals, cv's will range from 5-35 percent at the U.S. level and 5-75 percent at the state or regional level. Some rarer items could have cv's above 100 percent. These items have insufficient data for publication and these instances are noted with an asterisk (*).

Non-sampling errors occur during a survey process, and unlike sampling variability, are difficult to measure. They may be caused by interviewers failing to follow instructions, poorly worded questions, non-response, problematic survey procedures, or data handling mistakes between collection and publication. In these surveys, all survey procedures and analyses were carried out in a consistent and orderly manner to minimize the occurrence of these types of errors.

Terms and Definitions

Active ingredient: Refers to the mechanism of action in pesticides which kills or controls the target pests. Usage data are reported by pesticide product and are converted to an amount of active ingredient. A single method of conversion has been chosen for active ingredients having more than one way of being converted. For example in this report, copper compounds are expressed in their metallic copper equivalent, and others such as 2,4-D and glyphosate are expressed in their acid equivalent.

Allelopathic: The release of chemical compounds from a plant that will inhibit the growth of another plant, such as weeds.

Application Rates: Refer to the average number of pounds of a fertilizer primary nutrient or pesticide active ingredient is applied to an acre of land. Rate per application is the average number of pounds applied per acre in one application. Rate per crop year is the average number of pounds applied per acre counting multiple applications. Number of applications is the average number of times a treated acre received a specific primary nutrient or active ingredient.

Area applied: Represents the percentage of crop acres receiving one or more applications of a specific primary nutrient or active ingredient. This report does not contain acre treatments. However, acre treatments can be calculated by multiplying the acres planted by the percent of area applied and the average number of applications.

Avoidance: May be practiced when pest populations exist in a field or site but the impact of the pest on the crop can be avoided through some cultural practice. Examples of avoidance tactics include crop rotation such that the crop of choice is not a host for the pest, choosing cultivars with genetic resistance to pests, using trap crops, choosing cultivars with maturity dates that may allow harvest before pest populations develop, fertilization programs to promote rapid crop development, and simply not planting certain areas of fields where pest populations are likely to cause crop failure. Some tactics for prevention and avoidance strategies may overlap.

Barley: Fertilizer Primary Nutrient Application, Montana, 2003 1/

Primary Nutrient	Area Applied	Applications	Rate Per Application	Rate per Crop Year	Total Applied
	Percent	Number	Pounds per Acre		Million Lbs.
Nitrogen	92	1.3	33	44	44.2
Phosphate	88	1.0	30	31	30.2
Potash	52	1.0	16	17	9.7

1/ Montana planted area for 2003 barley was 1.1 million acres.

Barley: Agricultural Chemical Applications, Montana, 2003 1/

Agricultural Chemical	Area Applied	Applications	Rate per Application	Rate per Crop Year	Total Applied
	Percent	Number	Pounds per Acre		1,000 lbs
Herbicides:					
2,4-D	36	1.2	0.35	0.45	177
Acetic acid	7	1.0	0.29	0.32	24
Bromoxynil	15	1.0	0.31	0.31	53
Butoxy. ester	14	1.0	0.37	0.40	61
Clopyralid	3	1.0	0.08	0.08	3
Dicamba	12	1.5	0.05	0.08	11
Fenoxaprop	3	1.0	0.06	0.06	2
Fluroxypyr	3	1.0	0.08	0.08	3
Fluroxypyr 1-methylh	3	1.1	0.07	0.09	3
Glyphosate	45	1.6	0.38	0.62	307
Imazamethabenz	5	1.0	0.35	0.35	19
MCPA	20	1.0	0.36	0.37	83
Metsulfuron-methyl	11	1.0	0.002	0.002	2/
Thifensulfuron	9	1.0	0.007	0.007	1
Tralkoxydim	12	1.0	0.13	0.13	18
Triallate	13	1.0	1.26	1.26	177
Triasulfuron	10	1.0	0.009	0.009	1
Tribenuron-methyl	15	1.0	0.005	0.006	1

1/ Planted acres for Montana in 2003 were 1.1 million acres. 2/ Total applied is less than 500 lbs.

Barley: Agricultural Chemical Applications, Program States, 2003 1/

Agricultural Chemical	Area Applied	Applications	Rate per Application	Rate per Crop Year	Total Applied
	Percent	Number	Pounds per Acre		1,000 lbs
Insecticides:					
Carbofuron	2/	1.4	0.11	0.16	3
Disulfoton	2/	1.0	0.69	0.69	7
Lambda-cyhalothrin	2/	1.0	0.02	0.02	3/
Methyl parathion	2/	1.0	0.25	0.27	9
Fungicides:					
Propiconazole	2/	1.0	0.07	0.08	11
Pyraclostrobin	2/	1.0	0.05	0.05	1
Tebuconazole	2/	1.0	0.08	0.08	11
Other					
Ethephon	2/	1.0	0.28	0.28	12

1/ Planted acres in 2003 for the 11 Program States were 4.9 million acres. States included are CA, ID, MN, MT, ND, PA, SD, UT, WA, WI, and WY. 2/ Area applied is less than 0.5 percent. 3/ Total applied is less than 500 lbs.

Trade Names, Common Names, and Classes

The following is a list of common names of active ingredients with the associate class and trade name. The classes are herbicides (H), insecticides (I), fungicides (F), and other chemicals (O). This list is provided as an aid in reviewing pesticide data. Pre-mixes are not listed. The list is not complete and NASS does not mean to imply use of any specific trade name.

Class	Common Name	Trade Name
H	2,4-D	Agasco, Amine, Barrage, Class, DMA, Dacamine, Defy, Envy, Formula, Hi-Dep, Riverside, Salvo, Savage, Shotgun, Starane, Tiller, Turret, Weed Rhap, Weedar, Weedmaster, Weedone
H	Acetic acid	Esteron, LV 4, LV 400, Salvan, Starane + Salvo
H	Bromoxynil	Brominal, Bromox/MCPA, Bromoxynil, Bronate, Bucril, Bucril+Atrazine, Moxy+Atrazine, Rhino
H	Butoxy. ester 2,4-D	2,4-D/Weedone LV6
H	Clopyralid	Accent, Curtail, Hornet, Stinger
I	Dicamba	Banvel, Celebrity, Clarity, Cleanout, Fallow Master, NorthStar, Oracle, Rave, Weedmaster
H	Fenoxaprop	Puma, Tiller
H	Fluroxypyr	Starane, Starane+Saber
H	Fluroxypyr l-methyl	Starane+Salvo, Starane+Sword
H	Glyphosate	Bronco, Buccaneer, Clear-Out, Cornerstone, Credit, Engame, Expert, Fallow Master, Field Master, Gly Star, Glyfos, Glymix, Glyphomax, Glyphosate, Honcho, Landmaster, Mirage, RT Master, Rattler, Ready Master, Roundup
H	Imazamethabenz	Assert
H	MCPA	Agasco, Bromox, Bronate, Chiptox, Curtail, Dagger, MCP Ester, MCP Amine, Rhino, Rhomene, Rhonox, Starane+Sword, Sword, Tiller, Weedone, Wildcard
H	Metsulfuron-methyl	Ally, Finesse, Valuron
H	Thifensulfuron	Ally, Basis, Harmony, Pinnacle, X-TRA Cheyenne
H	Tralkoxydim	Achieve
H	Triasulfuron	Amber
H	Triallate	Buckle, Far-Go
H	Tribenuron-methyl	Ally Extra, Express, Harmony, X-TRA Cheyenne