Agricultural Newsletter

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Inside this Issue

Use Winter to Make Your Farm Safer

John Markus
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Once the stress of fall harvest is out of the way, you can use the time wisely to make your farm safer for you and your family, as well as for your employees. Now is the time to get started, because once the spring rush starts, it will be more difficult to do what is needed.

One of the first things to do is to be sure all safety devices are in operating condition on machinery you put away for the winter, while harvest activities are still fresh in your mind. Find and fix any safety-related problems you may have noticed but did not take time to repair, such as a missing or broken shield, burned-out light bulb, troublesome switch, or faded SMV emblem. Do the same for other equipment which you might use this winter or next spring. Next year you may be in a hurry and not take the time to fix them. In addition, take care of any safety-related field problems, such as a hidden hole or washout. By next spring they may have slipped your mind again.

A key task is to conduct an all-farm inspection. Inspecting machinery for safety problems is crucial, but you need to take a slow and observant walk around the entire farmstead. Make a deliberate effort to look at buildings and other structures. Check such things as wiring; the condition of steps, walkways, and ladders; gates and fences; and anything else that could cause an injury to you or someone else. Hazardous areas such as chemical storage buildings or manure storages should have warning signs as well as barriers to keep children and unauthorized people out. General housekeeping is important to prevent slips and falls, and sets the overall tone for a safe and orderly operation. Contact your county Extension office for Extension publications on conducting farm safety inspections.

Think about emergency needs such as fire extinguishers or emergency phone numbers, and whether they are located for easy and rapid use. Everyone who lives or works on the farm should be instructed on where to call for help. Someone on the farm should be trained in basic first aid.

Training of family members and employees can be conducted in the winter as well. You can obtain and read Extension safety publications, and many county Extension offices have or can obtain safety videos that you can borrow. Children can be involved in a family discussion of farm hazards and safety practices.

There are many things you can do during winter to make your farm safe. Don't wait until spring, when time is at a premium and everyone is in a hurry. Your safety, as well as that of your family and employees, is too important.

Source: Mark Purschwitz, Wisconsin Farm Safety and Health Specialist
Minnesota/Wisconsin Engineering Notes/November 2001

Canola research, production & marketing updates

Mike Mlynarek
Superintendent
Ashland Ag Research Station

Over the past several years I've kept you updated about canola research, production and market developments. Here's the latest.

Three U.W. Ag Research Stations each tested over 30 commercially available varieties and experimental entries. At Ashland, yields ranged from 1691 lbs/a to 564 lbs/a, with an average of 1222 lbs/a. Ashland Station yields were limited by crusted seedbeds, drought and heat stress. At Arlington, yields ranged from 2956 lbs/a to 1371 lbs/a, with an average 2303 lb/s. Sturgeon Bay recorded yields from 2846 lbs/a to 1400 lbs/a, and an average of 2249 lbs/a. Complete canola research results should be posted soon at http://brassica.agronomy.wisc.edu/.

A ten acres production field of Hyola 401 at the Ashland Station yielded 1460 lbs/a. Again, seedbed crusting, drought and heat stress limited yield. In 2000 our ten acre field of the same variety yielded 2632 lbs/a. A thirteen acre planting of Hyola 401 near Mason, WI, yielded an estimated 2,000 lbs/a in 2001.

In September, we marketed canola seed produced at the Ashland Station and on cooperating farms during 2000 and 2001. Seed went to Harvest States' grain terminals in Superior, WI, at a contract price of $8.90/cwt, or 8.9 cents/lb. In recent years, contract prices have been in the range of $8.00/cwt to $12.00/cwt. Some key points learned from this marketing arrangement include:

- The Superior terminal may not be buying canola every year, but they have each of the past several years.
- The contract period may be very short.
- Product needed to be delivered between 8/27/01 and 9/15/01 and final contract details were first available about 8/20/01.
- You must work via the buyers in St. Paul at 800-535-4665.
- I called them weekly, starting in early August, regarding contract details so that I had enough lead time to arrange for trucking during the specified delivery period.
- Harvest States was excellent to deal with--no problems--and we had a check ten days after seed was delivered to Superior.
- Trucking was fairly expensive, we paid a private hauler an hourly rate for his services.
- The hauler had considerable "idle" time waiting in line to unload.

Additional limited market opportunities may be available through Badger Oil of Spooner, WI. A fairly large market may develop in Iron River, Michigan if a proposed seed crushing plant is built. Plant financing negotiations are nearing completion. Plant proponents hope that regional canola production will develop to supply the needed seed. By-product canola meal would be available. It is a reasonable substitute for soybean meal in livestock rations and is heavily used where farmers have access to it.

For comprehensive information about canola, see www.canola-council.org.

Best wishes in 2002!!!

Will frost seeding work for you?

Tom Syverud
Extension and Outreach Educator
Ashland, Douglas, & Iron Counties

Frost seeding, sometimes called overseeding, is the practice of broadcasting seed on frozen ground in early spring. It can be an economical way to improve the yield, forage species mix and palatability of pastures and old rundown hay fields. Frost seeding is most successful in bare ground disturbed pasture areas or in very thin grass stands. All commonly grown legumes can be established by frost seeding. The ones with the greatest seedling vigor will work the best, such as alsike, ladino or red clover. Grasses can also be frost seeded; however, the success rate is lower. Annual and perennial ryegrass, orchardgrass, tall fescue and bromegrass are listed in the order of best chance of success. Seeding rates vary from 3 to 6 pounds per acre for legumes, and 4 to 10 pounds per acre for the grasses.

Research shows that the higher seeding rates will result in better legume stands. Frost seeding of legumes works well about 50% of time or two out of four years. Legumes establish better than grasses because they are rounded, dense seed that drop to the ground easily. This is important because seed to soil contact is critical for germination. Legumes will also germinate at the lower temperatures of early spring. The freezing and thawing of the soil, combined with early spring rains, help the germination of seed. Grass seed is light and fluffy and does not incorporate as well as legume seed. It also germinates later in the spring with warmer temperatures. The rate of grass frost seeding success is only 20% to 30%. This means one year of a good catch, one of a failure and two years of mixed results. Since frost seeding may cost only 20% of conventional seeding, you can afford to try it for three to four years before you have a success. Management after establishment is also important. Grazing three to four

weeks after germination, will release the seedlings from early forage competition. The young plants will then utilize the light, water and nutrients more efficiently. Applying fertilizer at seeding is not recommended because it will stimulate the existing forage causing more competition. Fertilizing later in summer, after plants are well established will, however, improve the long-term success and survival of the forage stand.

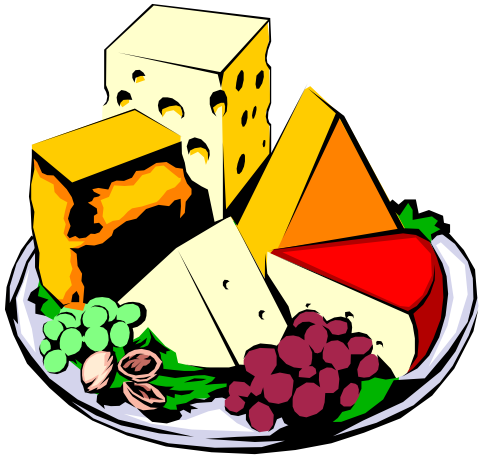
On Dairy-L -- Imports of milk protein concentrates: Assessing the consequences

Tom Syverud
Extension and Outreach Educator
Ashland, Douglas, & Iron Counties

Dairy farmers in the U.S. are angry about imports of Milk Protein Concentrates, according to Ken Bailey, Penn State University. Commonly referred to as MPC, this product is essentially dried protein derived from milk using a new technology known as "ultra filtration." Since it is a dairy product rich in protein, MPC can be used to make cheese, particularly nonstandard cheeses. It is also increasingly sought after for use in nutritional products such as sport shakes and nutrition bars. Surprisingly, MPC's are currently imported with very little trade restrictions, and the volume coming into the U.S. has been increasing each year. In 2000, 116.1 million pounds of MPC were imported, up 270 percent from 1996. The top 10 importers in 2000 (ranked by value) include Oceania (New Zealand and Australia), the European Union, and Canada.

The question is, does this represent a lot of imported protein? A recent Penn State staff report attempted to address this question. Here are the findings for 2000 on MPC imports:

- They were equivalent to 1.6 - 1.9 percent of US milk production.



- They were equal to 3.8 - 4.4 percent of the casein used in US cheese production.
- They were equivalent to 17.9 - 21.2 percent of the casein used in nonfat dry milk production.
- They rose when world prices fell significantly below the domestic price of nonfat dry milk.
- They began to decline in when world prices for nonfat dry milk raised U.S. prices.

In conclusion, there is reason to suggest that MPC imports are significant relative to the amount of protein produced and consumed in the U.S. And, MPC imports appear to grow when there is a widening gap between the domestic U.S. price of nonfat dry milk and the world price. Finally, MPC imports increased just when domestic consumption of nonfat dry milk fell, suggesting these imports may have substituted for domestic milk solids and impacted the cost of the dairy price support program. This has implications for the U.S. dairy industry, since world prices for nonfat dry milk have been declining in recent months and USDA lowered the support price for nonfat dry milk from $1.00 to $0.90 per pound earlier this year. The full text of the Penn State study may be found at: http://dairyoutlook.aers.psu.edu/reports/Pub2001/StaffReport343.pdf.

4th Annual Value Added Conference

Kevin Schoessow
Area Agricultural Agent
Burnett, Sawyer, & Washburn Counties

For the last several newsletters I have made attempts to help farmers identify new ways to diversify their farming operations through value-added enterprises, direct marketing efforts, or by diversifying into organic production or alternative crops. Staying with this theme, I would like to highlight the Fourth Annual Midwest Value Added Conference, "Bringing Profit Back to the Farm" held February 1-2, 2002 at the Ramada Inn and Conference Center in Eau Claire, WI.

This is an ideal conference for any farmer interested in exploring new options for their farm. I have attended the Value Added Conference every year and I am always amazed at the creative ways farmers are creating new opportunities.

The 24 workshop sessions offer a diversity of learning experiences, with topics ranging from "Maintaining cash flow in winter" to "Marketing techniques that can work for you," "Value added dairying," and "Working with your meat inspector and processor". A reception Friday night will offer foods from local value-added enterprises.

The keynote presentation will be by Jean Feraca, popular host of Wisconsin Public Radio News and Information Network. The Friday afternoon session is titled "A Consumer's View of the Future of Food and Farming."

Registration is $70 for both days, or $45 for Friday only and $35 for Saturday only, and includes lunches and a Friday reception. Lodging fees are extra. The early registration deadline is January 18th; there will be a $10 additional fee after that. For information about attending the conference or bringing a display to the Trade Show, visit the web site at http://www.uwex.edu/ces/agmarkets/valadconf.html or contact me at 1-715-635-3506 or 1-800-528-1914.

Tips for direct marketing success

Kevin Schoessow
Area Agricultural Agent
Burnett, Sawyer, & Washburn Counties

There is a growing number of farmers and producers in the area looking at direct marketing as a way to add value to their farming operation. Making these changes may be as simple as parking a wagon along side the road and selling straw bales, pumpkins, or sweet corn, or it may involve developing a processed product such as beef sticks or soy nuts, and marketing them to local, regional or national retail stores.

For farmers interested in this type of marketing there is much to learn, especially from other retail industries. Below is a list of suggestions taken from The Small Farm Digest V 4, No2 - Winter 2001. While the focus here is on fruits and vegetables, it can easily be applied to other farm products or services.

- Identify your customer base and target your market early in the season.
- Know your customers, including ethnic groups wanting specialty produce and marketing methods that fit their culture.
- Visit nearby grocery stores and study what fruits and vegetables are carried, product display techniques, and people traffic flows. Do stores buy produce locally or import?
- Consider producing fruits and vegetables not carried there.
- Know customers' buying habits and regional growing seasons' windows of opportunity.
- Every region has its own mix of crops that can be successful — find your niche.
- Market your region's and farm's identity in a unique way through a logo and quality products.
- Choose marketing plans that are adaptable to your family, operation, lifestyle, and personality.
- Diversify crops and have complementary marketing outlets to keep income flow steady.
- Think years ahead to plan your operation's growth.
- Successful growers know how much cost they have in their operation and where they are losing money.
- Focus labor and expenditures on high-value earning crops.
- Farms should look tidy and produce be clean to project a quality message.
- Be dependable with produce availability and hours of operation.
- Market fruits and vegetables by telling what sets your produce apart — such as your growing practices and health advantages like phytonutrients, vitamins, or antioxidant content.
- Consider turning your fruits and vegetables into a value-added retail consumer item like jams, salsas, garlic braids, dried fruits, or herbs.
- Take time to talk with customers. People appreciate friendly contacts.
- If you don't like dealing directly with the public, assign that job to another family member or hire someone with strong people skills.
- Cultivate community presence by forming a connection to your local community.
- Stand behind your product with product replacement or a money back guarantee.

Grant programs available to farmers

Kevin Schoessow
Area Agricultural Agent
Burnett, Sawyer, & Washburn Counties

Every year I get questions from farmers about grant programs available to explore some innovative idea or project they may have. Depending on the innovation there maybe several grant options, or they maybe non at all. There are several public grant programs farmers may tap into. Two that I am familiar with are the Agriculture Development and Diversification (ADD) grant from the Marketing Division of the Department of Ag Trade and Consumer Protection (DATCP) and producer grants from the Sustainable Ag Research and Education (SARE) program.

DATCP will have $400,000 available to fund grants in 2002. ADD grants are awarded competitively to individuals, associations, agribusinesses and industry groups. Grants are limited to $50,000, and projects must be completed within three years. The program funds projects that are likely to stimulate Wisconsin's farm economy with new production or marketing techniques, alternative crops or enterprises, new value-added products, or new market research. However, there are no preset parameters that determine what type of projects will receive funding. DATCP will be accepting grant proposals between January 15 and March 15, 2002.

The SARE Producer grants, ranging from $2,000 to $15,000, support ideas initiated by farmers that protect natural resources, enhance communities, and boost profitability. SARE producer grants proposals are due mid-March with funds available in September.

For more information on either of these grants call me at 1-715-635-3506 or 1-800-528-1914, or view their websites at http://datcp.state.wi.us/mktg/business/value-added/add/ or http://www.sare.org/ncrsare/prod.htm.

Heard it on the fenceline.....

Kevin Schoessow
Area Agricultural Agent
Burnett, Sawyer, & Washburn Counties

.....You've heard of Bt corn or Glyphosate (Roundup) resistant soybeans, but what about *Staphylococcus aureus* (i.e. mastitis) resistant cows? As reported by the USDA Agriculture Research Service, researchers have cloned a purebred Jersey cow with an inserted gene that increases the production of lysostaphin, a protein that helps resist attacks from *S. aureus*.

.....Afraid of being sued? There is an ongoing explosion in employment-related litigation in the U.S. today, and private employers are the targets. That was the message Attorney Tex McIver of Fisher & Phillips LLP in Atlanta, Georgia brought to nearly 300 attendees at the firm's recent Employment Law Seminar 2001 held in Atlanta. The number of licensed lawyers increased from 326,842 in 1970 to more than one million in the year 2000, bringing the number of lawyers per capita to one lawyer per every 282 persons in the U.S.

We're on the Web!

You may find this newsletter, our gardener's newsletter, and additional information on our upcoming events by visiting the websites of the **Spooner Agricultural Research Station:**

http://www.uwex.edu/ces/sars/index.htm

and the **Ashland Agricultural Research Station**:

http://www.uwex.edu/ces/aars/

Is your home energy efficient?

Bill Saumer
Area Agricultural Agent
Burnett, Sawyer, & Washburn Counties

Many of us have heard about all of the benefits of having an energy efficient home and appliances and how this can positively affect the financial well-being of a family or business. Since I work with the profitability of farmers and non-farmers alike with their enterprises and families, this is an important issue. Often times it is cost prohibitive for people to improve the energy efficiency of their home or facilities and the improvements just do not get done, even if in the long run it is the best thing to do.

That is why the legislature thought it was important to have money available for income qualified people to make these improvements and save many long term dollars in energy costs. The University of Wisconsin is involved in this program to help with the referral and application process to get this project going and to get the improvements done. Other people are also involved in other steps in the program including energy analysis of buildings and appliances, work proposal approval, funds reserved, work completed and quality assurance.

There are many different components to this program and improvements can include lighting and hot water systems, solar hot water, geothermal heat pumps, HVAC systems, and appliances on existing homes and new construction.

Basically, this program is designed to help these people make improvements that would not normally be able to do so. If you think you might be able to qualify or know of someone who would be able to take advantage of these legislative dollars and make their home more energy efficient, do not hesitate to call. You can call us at our extension offices or call the Residential Information Center on their toll free number, 1-800-762-7077.

This Quarter's Events

January 14, 2002, Grazing and Organic Dairy: Options to Consider, St. Cloud Holiday Inn. Call 218-445-5475

January 22 - April 9, 2002, Master Gardener Course, Ashland Ag Research Station.

January 24, 30, & February 6, 2002, Dairy Price Risk Management workshop series, Rice Lake.

January 31, February 5, & 12, 2002, Dairy Price Risk Management workshop series, Camp Icaghowan west of Amery.

January 31 - February 1, 2002, Upper Midwest Regional Fruit & Vegetable Growers Conference, St. Cloud Civic Center. Call 763-434-0400.

February 1-2, 2002, Value Added Conference, Eau Claire. Call 715-635-3506 or visit www.uwex.edu/ces/agmarkets/valadconf.html.

February 4-6, 2002 WI Grazing Conference, Stevens Point.

February 9-10, 2002, Farm Couples Getaway, Park Inn, Eau Claire. Call 608-264-4432.

February 14, 2002, Advanced Milk Marketing Workshop, Barron

February 15, 2002, Advanced Milk Marketing Workshop, Milltown Community Center.

March 1-2, 2002, Upper Midwest Organic Farming Conference, LaCrosse. Call 715-772-3153 or visit www.mosesorganic.org.

March 6, 2002, Private Pesticide Applicator Training, Spooner Ag Research Station.

March 7, 2002, Private Pesticide Applicator Training, Grantsburg.

March 15-16, 2002, Wisconsin Aquaculture Conference, Eau Claire. Call 608-224-5137 or visit www.wisconsinaquaculture.com.

March 15-16, 2002, Upper Midwest Organic Farming Conference, UW-LaCrosse.

Attention Dairy Farmers

From the thrill of victory to the agony of defeat!

Bill Saumer
Area Agricultural Agent
Burnett, Sawyer, & Washburn Counties

Many of you may remember this weekly introduction to ABC's Wide World of Sports television program from a few years ago. When they said the thrill of victory they showed an excited athlete coming out on top in first place. For the agony of defeat part they showed a ski jumper losing control on the jump, going off the side of the jump and hitting snow, ice and other objects and eventually crashing into a fence. This is the same kind of ride farmers have experienced with the prices they receive for their agriculture commodities, especially milk. To many farmers it seems that they experience more agonies than thrills, even if records prove they received more favorable prices than poor prices. The reason for this is because many farmers remember the bad times very vividly and override the memories of good prices. There are also some overoptimistic farmers out there and they only remember the best prices they received. No matter which of these categories you fall into or even if you are somewhere in between, it is extremely important to implement a dairy price risk management plan.

I have also heard of farmers complain that they contracted a commodity and ended up losing money on the deal and then decided that they were not going to participate in a marketing strategy again. That's too bad. When these same farmers took exams in high school or college did they get perfect scores? When they got a test back and if they did not get all of the answers right, did they quit? Of course not! The same educational scenario applies to a marketing plan. When you get one wrong answer, you just remember what was done wrong and make the necessary adjustment for next

strategy. You can not afford to up and quit and say, "I'll never do that again!" Contrary to what some farmers feel, marketing is entirely different than gambling. When you gamble you have a very good chance of losing, but when you have a marketing plan, you have excellent odds of winning and keeping your operation profitable every single month throughout the year!

You can begin to develop your milk marketing plans by attending our Dairy Price Risk Management seminars lined up for this year. Don Drost, Tim Jergensen and I will host these three day seminars in two locations. One will be in Rice Lake on January 24, 30 and February 6. The other seminar will be on January 31 and February 5 and 12 at Camp Icaghowan just west of Amery. It is mandatory to attend all three seminars because each session builds on the work done in the previous session. It is possible to switch a location if your circumstances require it and anybody involved in farming knows how situations can change!

For those of you who participated in our Dairy Price Risk Management seminar last year or will participate in the seminars in January and February 2002, we have a real treat for you on February 15th. Bob Cropp will be our featured guest at an Advanced Milk Marketing meeting. This is a one day event from 10 AM to 3 PM and will be held at the Milltown Community Center. If you can not attend on the 15th of February, Bob will also be putting on the same seminar on the 14th in Barron.

In order for us to have the necessary room and materials, it is important to preregister. Call any one of the three offices Don Drost, Tim Jergenson and I work out of. Don is in Barron County at 715-537-6250. Tim is in Polk County at 715-485-8600. I am located at the Spooner office at 715-635-3506 or 1-800-528-1914. Call any of these numbers to preregister or to get your milk marketing questions answered!

Update on herbicide resistance

Mike Bertram
Asst. Superintendent
Spooner Ag Research Station

Herbicide resistance refers to plants within a weed species that, after repeated use of a herbicide, are no longer controlled by normal rates of that herbicide. In other words, the herbicide no longer works. The first reported herbicide resistance in weeds was to atrazine in 1968. Currently there are 154 weed species in the world that show some type of resistance to one or more herbicides. In this article, I will explain some of the basics behind herbicide resistance, update the current status in Wisconsin, discuss new cases of resistance to glyphosate (Roundup), and explain steps to delay herbicide resistance in your fields.

Herbicides work by blocking enzymes that are essential for plants to carry out reactions. An easy way to envision this is that a tractor moving forward is the reaction and the tires are enzymes. It cannot move without tires. A row of spikes is like the herbicide. It stops the tractor by puncturing the tires. The reaction is stopped and the susceptible weed is killed. In a population of weeds, one in a million to one in a billion may be slightly genetically different and able to resist the herbicide. This would be like a tractor with tracks going over the spikes without being stopped. One in a million may seem like a small number, but five weeds per square foot in a five-acre field is over one million weeds.

Selection intensity is another key term. This refers to how often and how aggressively a field is treated with a herbicide that kills weeds in a certain way. Herbicides are grouped into families. A family has a similar chemical structure and mode-of-action (the specific reaction it stops). For example, triazines stop photosynthetic reactions; ALS herbicides stop amino acid synthesis. Herbicides are effective weed killers. Not many weeds are left after an application. However, if a resistant weed is not killed and

goes to seed, the population will increase. If the same herbicide family is used the following year, more resistant weeds survive and produce seed. After a couple of years of the same herbicide, it appears to stop working. By now the resistant weed seed bank has built up and a different family of herbicides is the only to control the resistant weeds.

There are 11 different types of herbicide resistant weeds in Wisconsin. The first reported was common lambquarters resistant to atrazine in 1979. Currently, over 100,000 acres are infested with this weed. The situation has stabilized, however, because of the decreased use of atrazine and many new herbicides released since then. Three other weeds in Wisconsin are resistant to triazines. Smooth pigweed was first reported in 1985, kochia in 1987, and velvetleaf in 1990. There are two weeds resistant to the grass herbicides, which include Poast Plus and Fusilade. Giant foxtail was reported in 1991 and large crabgrass in 1992, both in southern Wisconsin. So far, these are confined to two sites and under 100 acres. ALS inhibitors are fairly new, but have seen high usage. These include sulfonylureas (Accent, Beacon) and imidazolinones (Pursuit, Raptor). Several cases of weeds resistant to these herbicides have been reported in Wisconsin in the last couple years.

Kochia and common waterhemp cause major headaches in other states and they have invaded the southern part of Wisconsin in the past decade. Kochia resistant to Oust was found in 1995. Waterhemp resistant to Pursuit was confirmed in 1999. Waterhemp is expected to increase, so hopefully it doesn't make it to the north. Giant foxtail resistant to ALS herbicides was identified in 1999. The field had a history of Accent on corn and Pursuit on soybeans for several years. Resistance was 15-fold to Pursuit and 20-fold to Accent, meaning a 15X or 20X the labeled rate of herbicide would be needed to kill the giant foxtail, respectively. The plants were also cross-resistant to other ALS herbicides, meaning they would also be ineffective. Green foxtail resistant to Raptor and other ALS herbicides was found in a Chippewa County field in 1999. The most recent case in Wisconsin is Eastern black nightshade in a soybean field in Columbia County. Resistance was 150-fold to Pursuit and 120-fold to Raptor. Pursuit had been applied in 1997 and 1995, but no ALS herbicide in 1998 and 1996. ALS herbicides are very useful, but also have a high potential to develop resistance.

A question repeatedly asked is when are weeds going to be resistant to Roundup (glyphosate). In a few cases they already are. The first cases of glyphosate-resistance were reported in 1996 in Australia. Rigid ryegrass in a wheat-fallow-sorghum rotation was not controlled after 30 to 40 applications of Roundup over 15 years. It was later found in an orchard setting. Glyphosate-resistant rigid ryegrass was also found in an almond orchard in 1998 and vineyards in South Africa in 2001. Another weed species resistant to glyphosate is goosegrass in an orchard in Malaysia. This was found in 1997 and is also resistant to Fusilade. Italian ryegrass in an orchard in Chile was also suspected of glyphosate resistance in 2001. Roundup Ready crops have gained in popularity in recent years, especially soybeans. Horseweed (marestail) has always been tough to control, even with Roundup. In 2000, a field of no-till soybeans in New Jersey had many horseweed plants escaping treatment. Lab tests confirmed that there was an 8 to 10-fold tolerance level to Roundup, but there was severe growth reduction with a normal rate. In 2001 additional fields were found in Delaware and Tennessee and it is believed about 1000 acres are affected. It is not certain how long it will take for resistance to common weeds to show up in the Midwest, but it may already be started. It typically takes about 30% of the weeds to survive before a person realizes there is a problem. Some waterhemp populations have already shown a greater tolerance to glyphosate. Also of concern are shifts in weed dynamics. Weeds that germinate later may become more prolific because they avoid the herbicide application.

The only way to absolutely prevent resistance is to not use herbicides. Since this is not feasible in many cases, some guidelines have been developed.

1. Scout to identify weeds present.

2. Use herbicides only when necessary.

3. Rotate among herbicides with different modes-of-action. (Do not make two consecutive applications of herbicides with the same site-of-action in the same field unless other control practices are included.)

4. Apply tank-mixed, prepackaged, or sequential mixtures that include multiple sites of action. This way, the second herbicide will kill any weeds escaping the first. However, both herbicides must have substantial activity against the target weed and this option could be expensive.

5. Rotate crops, particularly those with different life cycles (e.g. corn and soybeans, winter wheat, alfalfa).

6. When planting herbicide resistant crops, do not use two consecutive applications of the same mode of action unless other control measures are incorporated. Some recommendations say to plant herbicide resistant crops only one out of every four years in a rotation.

7. Use cultivation and rotary hoeing whenever possible.

8. Include primary tillage in the weed control program if soil erosion potential is minimal.

9. Clean tillage and harvest equipment before moving from fields infested with resistant weeds to those that are not.

By understanding how herbicide resistance develops and following these common sense guidelines, we should be able to delay the process and keep our current herbicide options for many years.

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