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SAN JOAQUIN COUNTY
FIELD NOTES

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Combining dairy manure and no-till—can it be done?

At first thought, it may not seem practical to combine dairy manure in a no-tillage system. Many guidelines suggest that surface applied manure (not lagoon waste water) be incorporated into the soil for a variety of reasons, including odor control, limiting nutrient loss, and reducing the chance for off-site movement with irrigation or rainwater. Of course, running a disc across the ground to incorporate manure is antithetical to the no-till paradigm.

No-till and other forms of conservation tillage are very popular on farms east of the Rocky Mountains. In fact, in that area of the country conservation tillage is the standard way because it effectively controls soil erosion from rainfall. But here in California, conservation tillage use is in its infancy. Less than 2% of the annual cropland is under reduced tillage management. California producers have been slow to adopt this practice for a number of reasons; however, as the economic benefits continue to be shown, interest is increasing, especially in the dairy industry.

In fact, to date, the dairy industry has been one of the main adopters of no-till practices. Planting equipment for corn and small grains is readily available and no-till corn can be planted earlier, effectively extending the growing season. Producers should be pleased that no-till also provides a lot of environmental benefits like reduced dust and soil erosion. Of course, that warm fuzzy feeling may quickly disappear if switching to no-till reduces the amount of land available for manure application by an equal amount.

As a graduate student in Kentucky, I worked on a research project that looked at the impacts of manure and conservation tillage. In the spring and/or fall, we applied fresh dairy manure (about 80% moisture) at a rate to provide about 200 lbs N/acre, then did or did not incorporate. In a nutshell, the effects of manure application were the same for either a chisel-disc or a no-till system: the corn grew just as well in both, and the impact on water quality was also the same. Any problems with water quality were not the result of tillage; rather they were reflected in the *amount* of manure and fertilizer that was used (Stoddard *et al*, 2005). The nutrient benefits of manure were not reduced in the no-till system, and therefore adding more manure or fertilizer exceeded the nutrient demands of the crop. When more N was added than needed, we saw increased nitrate in the groundwater.

But lets not get bogged down in the adverse results—it is not difficult to understand that over-application of N, whether it be from manure or fertilizer, can impact water quality. The important point is that a surface application of manure that was not incorporated worked just as well as the plots where it was disced into the soil.

Would the results of this study apply here in dry, irrigated California? Carol Frate, Farm Advisor in Tulare County, has done some work looking into this. Sweeping the manure out of the furrows in the no-till systems facilitated irrigation, but otherwise there was no significant difference in corn silage yield compared to the conventional system. As no-till use increases in California, further research may be necessary but I believe manure can be used effectively in conservation tillage systems on the soils and environment in and around Merced County.

Scott Stoddard
Farm Advisor
Vegetable Crops and Soils, Merced and Madera Counties

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Use of Powdery Mildew model for reduction of fungicide application

Tomato powdery mildew (PM) has been a sporadic problem in the Central Valley during some years, most recently in 2004. On tomatoes, symptoms of powdery mildew are bright yellow spots on leaflets. With this mildew, you will not see powdery white sporulation on the tops of leaves as is common with mildews of squash or other crops. Rarely, a grayish sporulation may be visible on the underside of the leaflets. The characteristic spores and stalks can be seen on the underside of the leaflets if viewed with sufficient magnification (i.e., a good hand lens) and if conditions are right for spore production.

Damage to the crop includes loss of foliage and consequent sunburning of fruit. Once the canopy has been significantly damaged, any control measures are unlikely to have an impact. Fungicides currently available for mildew control include Quadris, Cabrio, and sulfur.

A model has been developed by Mike Davis and colleagues at UC Davis that predicts tomato PM based on temperature and relative humidity data from in-field weather stations. This should be very useful since preventative fungicide applications can become expensive and such sprays would often be unwarranted. Use of the model can help reduce the number of fungicide sprays needed to control the disease by improving the timing of the sprays. In fact, in validation work done in 10 processing tomato fields in 1995 and 1996, use of the model saved 2 to 5 fungicide sprays with no significant impact on fruit yield or quality.

This season I will be continuing the evaluation of this powdery mildew model to determine how well it performs in predicting this disease in the northern San Joaquin Valley. I will also be working on improving the user-friendliness of the computer-based model so that it is straightforward for growers and PCAs to deploy as part of their pest management plan of attack.

Brenna Aegerter
Farm Advisor

According to a recently published study by Rand Corporation, children who live where produce costs more are likely to gain more weight than those who live in areas where fruits and vegetables are cheaper. The study tracked more than 6,900 children in 59 metropolitan areas.

UPCOMING EVENTS

February 7
54th Annual Lodi Grape Day
7:30-1:00, Hutchins Street Square
contact: Paul Verdegaal 209-468-2085

February 10
National Animal Identification Workshop
12:30-5:00, Jackson Rancheria
Jackson, CA
contact: Ken Churches 209-754-6477

February 14-16
39th Annual World Ag Expo
Tulare, CA
info at: www.farmshow.org

February 21
Irrigation/Nutrient Mgmt. Mtg. & Cover Crop Field Day
Monterey County Agricultural Center
contact: Richard Smith 831-759-7357

February 21
SJ and Stanislaus Rice Grower's Meeting
8:30-11:30, Nathaniel's Restaurant
Escalon
contact: Mick Canevari 209-486-9493

February 22
San Joaquin Valley Table Grape Day
Visalia Radisson
contact: Bill Peacock 559-685-3303

February 23
Cherry Day – members only
Stockton, CA
contact: Jim Culbertson 209-368-0685

March 18
Latino Agricultural Heritage

Egyptian Alfalfa Weevil

The Egyptian weevil is the first insect pest problem in alfalfa after dormancy break. In early February, the Egyptian alfalfa weevils hatch and begin feeding on the new alfalfa growth. Weevils are a problem usually up to first cutting, although damaging populations may persist into the second cutting and occasionally the third cutting. The early instars feed in the alfalfa terminals, and the larger larvae feed on the leaflets. When populations are high, plants can be completely defoliated. Weevil management in alfalfa is focused on the period before the first cutting. Control options are insecticides and early harvest. Biological control is not effective at preventing economic damage because populations of natural enemies are not sufficiently large enough to provide control in the spring.

The threshold level for treatment is 20 weevil larvae using a 180° sweep net passing across the top half of the alfalfa plants. An average of 10 sweeps should be made in different areas of the field to determine the average population. Today, dormant varieties are more prevalent but have less growth/ height in February than the older non dormant varieties. When alfalfa is too short for the sweeps to efficiently cover enough plant surface other methods of assessment should be considered. The weevil threshold number may be less than 20 per sweep using the net method. In these situations a visual assessment of feeding damage is necessary along with sweeping.

An insecticide field study in established alfalfa was conducted in the spring of 2005 at UCD to evaluate weevil larvae control for 20 days following application and yield response. A 10% yield reduction occurred when 10 weevils per sweep was recorded. Lorsban was the least effective treatment providing the shortest length of control. (Table 1&2)

Mick Canevari
Farm Advisor

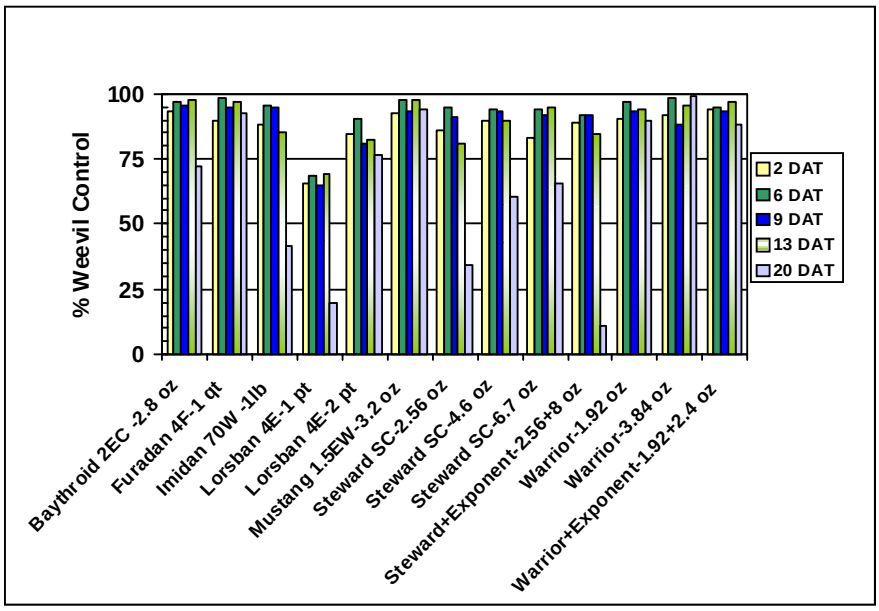


Table1. Insecticide Treatments

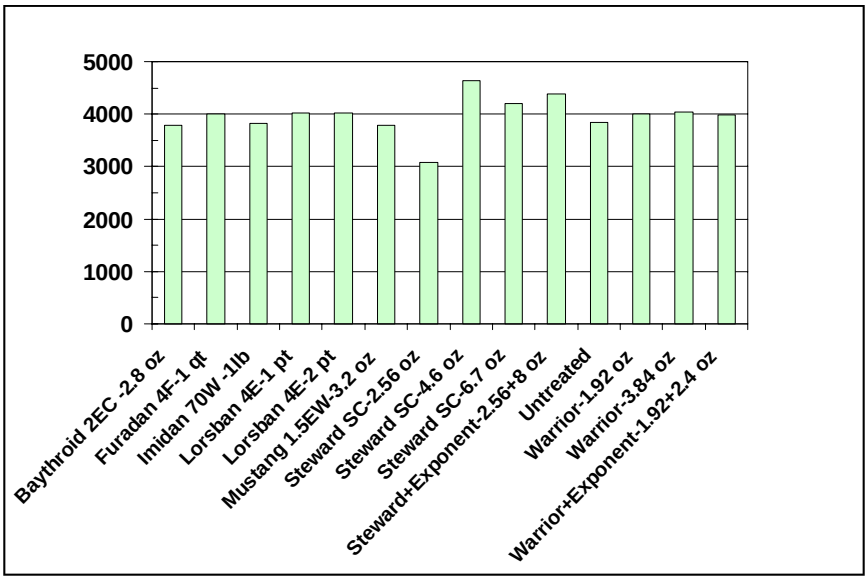


Table 2. Yield Lbs/A

Are English rootstocks the answer to blackline?

This article is excerpted from a recent article in California Agriculture magazine. (published by UC Division of Agriculture & Natural Resources, Oct-Dec, 2005). Contact our office if you want the full article.

San Joaquin County still has a high incidence of walnut blackline disease, caused by cherry leaf roll virus. Trees on black walnut and Paradox rootstock are susceptible to blackline, but trees on English rootstock are not. Seedlings of 'Eureka' and a few other varieties have been available as rootstocks for many years, but no thorough study of their performance has ever been done.

Several years ago, I set up two trials in a commercial walnut orchard near Linden to compare various English seedling rootstocks. Both trials were located in a 12' X 24' hedgerow planting, were formerly planted to walnuts and were methyl bromide fumigated prior to planting.

Site 1 was planted in 1989, and had 3 rows of Chandler trees nursery grafted on English walnut seedlings from 'Manregian' and 'Eureka' obtained from California sources, 'Ronde de Montignac' and 'Corne' from France, and a Spanish source collected from Tarragona, Spain. The trial rows were pollenizer rows planted every eighth row in a 'Vina' orchard. Site 2 was planted in 1994, and included seedlings from 'Eureka', 'Waterloo', 'Chandler', and 'Sunland' provided by a California nursery, two English walnut sources named 'Russian' and 'Carpathian', and Paradox seedlings from a California nursery. The test trees at Site 2 were located in five alternate 'Chandler' rows in a solid 'Chandler' planting. Trees for both sites were nursery propagated and planted as grafted two-year old trees.

I evaluated tree growth sites by making annual trunk diameter measurements. In-shell yield was measured in 1993, 1995, 1997 and 2003 at site 1 and in 1997 through 2003 at site 2.

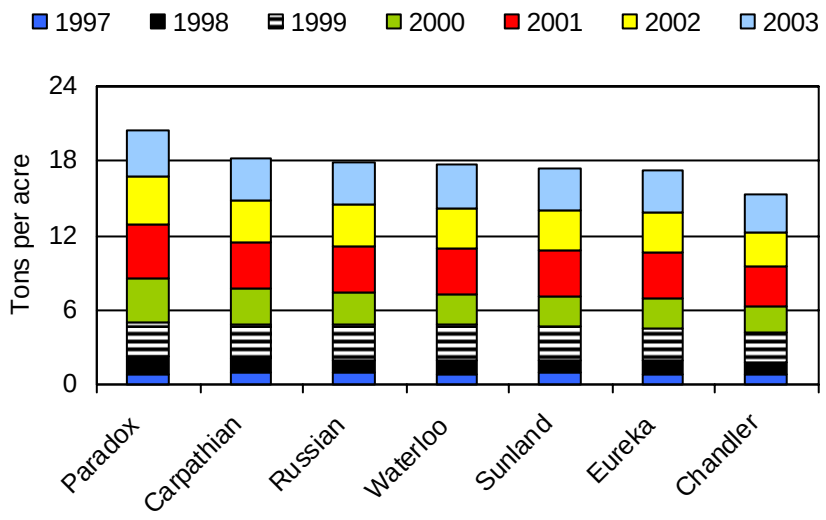
At Site 1, there were no significant differences among English rooted trees in tree growth or nut production in the years it was evaluated. Once trees were mature, yields in the trial were good for the Linden area, at 3.0 to 3.5 tons per acre.

At Site 2, trees on 'Chandler' seedlings were smaller than trees on 'Waterloo' seedlings in 1999 and 2000; otherwise, English rooted trees were similar in size. Paradox seedlings were larger than trees on any English rootstock from 1996 through 2003.

Yields at Site 2 were not significantly different among rootstocks in 1997, 1999 or 2003. Paradox rooted trees had higher yields (3.5 to 4.4 t/a, depending on the year) than trees on English rootstock sources in most years. Individual year yields were similar among English rootstocks (ranging from 3.2 to 3.5 t/a) except for 2000 and 2001, when 'Chandler' rooted trees had significantly lower yields than 'Carpathian' rooted trees, and 2002, when 'Chandler' rooted trees yielded less than trees on Russian seedling rootstocks.

Cumulative yield (1997 through 2003) for rootstocks at Site 2 was greater for Paradox rooted trees than any English seedling source. Cumulative yield of 'Chandler' seedling rooted trees was less than all other English sources except 'Eureka'. We attribute the higher yields of Paradox rooted trees and lower yields of 'Chandler' rooted trees to differences in growth and size of trees on these rootstocks.

Our results show that most English rootstock seedling sources produced trees with similar growth and nut production except for 'Chandler', which produced generally smaller and less productive trees than the other sources. Walnut growers wishing to plant orchards on English roostocks should avoid use of 'Chandler' seedlings.



Average nut production of Paradox and English rooted trees at site 2. Columns headed by different letters indicate cumulative yields that are statistically different.

No English seedling source we tested at Site 2 produced trees with growth and productivity of Paradox hybrid. Walnut growers needing blackline tolerance will likely incur some loss in orchard growth and nut production as a result of planting English seedling rootstocks. The question not answered by this trial so far is, whether the growth and yield advantages of Paradox rooted trees will be outweighed by the potentially longer life of English rooted trees as blackline incidence increases over the life of the orchard. In addition, English rooted trees are still considered more susceptible to Phytophthora root and crown rot and to damage by lesion nematode, so growers must carefully evaluate all the ramifications of their rootstock choice when planning a new orchard.

Joe Grant - Farm Advisor
Jim Ferrari - Linden Grower

Cold weather issues in grapes and almonds

Chilling Hours

Chill hours have been a concern for some crops, but grapes are beyond the minimum requirement of 200 to 300 hours and even almonds, for most varieties, are above the minimum of 400 hours below 45˚ Fahrenheit. There are several methods to calculate chill hours and a new system for calculation is being discussed. The traditional method was a simple total of hours below 45˚ F beginning November 1 and ending March 1. Another method considers chill hours between 32˚ F and 45˚ F from November to March. A newer method called the "Utah model" assigns proportional amounts of hours of chilling with maximum values between 32˚ and 45˚ and lesser values for each hour either below 32˚ or above 45˚F. It is important to note that the non-traditional methods may increase or decrease the standards for required chill hours. More recently "Chill Portions" beginning before November and going until March are being utilized by cherry growers. I will leave that for Joe Grant to explain at a future time.

Although chill hours are more of a concern for fruit and nut trees and not grapes, there are effects of winter conditions that may be evident in the spring with budbreak and flowering and crop potential. More is being learned about many of the factors that go into affecting spring growth and plant development, but unfortunately more questions pop up with each answer. The timing of chill hours accumulation, the "quality " of those hours, patterns of the cold hours versus warm hours, actual radiation (clear skies versus fog), soil types, aspect and slope, texture, etc., soil moisture, previous crop load, general plant health and weather conditions of the year past (among a few other items) make for a complicated situation to assess. The bottom line for grapes and almonds is, although we are below normal at this point for chill hours, there have been even lower years such as 2002.

Rainfall and Irrigation

The year 2006 started as and has continued to be wet, but mild. Rainfall totals are well above average, about 13.1 inches so far in the north county and 7.7 inches in the area south of Stockton. Normally the entire seasonal average ranges from 11 inches in the south to 17 inches in the north county. Since the precipitation occurred in large amounts over a short duration the stored vs evaporated water is large, leaving most soils at full root zone capacity. If rainfall continues at or even slightly below average for the remainder of the late winter/spring, soil moisture for both grapes and almonds should be in good supply.

While the 2004 season after budbreak saw no rainfall, last year (2005) there was 6 inches in the north county. It is possible to modify the soil water content with the use of cover crops. It is also possible to remove, on the average, 1.5 inches of soil water in an average year. This season cover crops got off to a late start and will put on most of the growth in the spring. This is the time the covers will pull water out of the soil. The temptation to leave the cover in after budbreak to use additional water should be tempered by the increased frost hazard. As spring arrives be aware of soil moisture conditions and plant demand, but be careful about "getting too far ahead" when spring rains continue to replenish the profile.

Regulated Deficit Irrigation has been more widely adopted in vineyards as compared to orchards, but more interest is developing in almonds for control of hull rot. Grape growers are managing deficits with a little lighter hand depending on soil type and production goals. The trend toward extended ripening has also lengthened the pre-harvest irrigation season. This affects the standard deficit irrigation schedules in that some schedules were planned to allow the vine to run out of water near the normal harvest date for sugars at the 24-25˚ Brix level. As a result, less severe deficits can maintain berry size and weight as harvest approaches. As bud break and bloom approach, it is a good idea to evaluate actual soil moisture down to five feet or more if possible. Using a neutron probe, electrical capacitance sensors, tensiometers, an auger or even a shovel can be helpful to avoid rapid or excessive stress before irrigation actually begins.

Nutrient Needs

Anytime you can gain field access is a good time to deal with soil problems such as pH issues or water penetration, but patience is needed to assess issues with most of the macro nutrients such as nitrogen and potassium. It's generally a good idea to wait until vines and trees actually begin utilizing the soil for nutrient uptake with regard to N and K before applying more. For vines that would be after bloom and for almonds that is well after petal fall. Besides the cost efficiency, more attention is being directed to anything that goes on the ground with a potential for leaching by either irrigation or rainfall. Early spring growth is fine for putting on the micro nutrients zinc or boron.

Frost

Besides nutrient applications other items for spring work include encouraging good shoot growth and protecting those shoots from disease.

(continued on pg 7)

2005 Bell Pepper variety evaluation trial

Now that there are a number of new pepper cultivars available to producers, information on yield and fruit quality, as well as disease resistance or tolerance is desirable for the local industry. This year's trial at Biglieri Farms on the Borden Ranch near Dry Creek, east of Galt, California was transplanted on June 10th. The soil type at the trial site was a Wyman silt loam and the trial field was alternate-row furrow-irrigated throughout the season. The resulting crop stand was excellent with vigorous early plant growth. A very hot July and August caused some plant stress, loss of fruit set and a subsequent delay in fruit maturity. Hand harvest of the trial was on September 10th. The trial included fifteen replicated varieties arranged in a randomized complete block design. In addition to marketable red and green yield figures, data on crop maturity and fruit size were taken (Table 1). Best quality fruit, including blocky shape and good fruit color and size was led by Double Up, Encore, Mercado, Red Bell, RPP 9650, Affinity, RPP 16900, and Baron. Fruit size for most of the lines evaluated was predominately Jumbo and Extra-large. Other than some fruit sunburn and blossom end rot and some cat-faced fruit, there were no other fruit defect problems. There was virtually no worm damage in the trial and none of the fruit had Pepper Spot (STIP).

Many thanks to Steve Biglieri, Todd and Grant Craven, Scott Whitely, Don Colbert, Randall Wittie, Debra Boelk, and Juan Aguilar for their contributions, and to the participating seed companies (Syngenta, Seminis and Sakata Seed) for their support of this work.

Benny Fouche
Farm Advisor

	Marketable yield/acre (red + green)		Crop maturity at harvest (%)			Fruit size (%)[2]					Total yield/ acre
Variety	Tons[1]	Boxes	Red	Green	Culls	Jumbo	Extra-large	Large	Medium	Small	Tons
Red Bell	16.01	1,281	1.5	58.5	40.0	34.2	25.9	23.6	9.9	6.4	26.82
Double Up	15.90	1,272	9.8	56.0	34.2	30.3	20.1	28.5	10.5	10.6	24.32
Encore	14.59	1,167	9.1	55.2	35.7	55.8	18.8	10.6	7.4	7.4	22.65
RPP16900	13.79	1,103	14.4	49.1	36.5	3.3	19.6	28.9	22.7	25.5	21.70
Mercado	13.50	1,080	4.3	57.2	38.5	66.3	17.3	9.7	2.9	3.8	22.10
RPP9650	13.43	1,074	8.4	47.1	44.5	64.5	21.8	10.9	1.1	1.7	23.67
RPP9661	13.39	1,071	5.3	57.3	37.4	53.1	14.4	8.9	9.7	13.9	21.31
Baron	13.35	1,068	12.1	48.7	39.2	4.1	27.7	32.7	21.7	13.8	22.10
Wizard	13.11	1,049	4.7	54.7	40.6	47.0	23.3	10.3	6.1	13.3	21.78
Affinity	12.70	1,016	11.3	46.0	42.7	51.0	21.9	14.8	3.6	8.7	22.87
Stiletto	12.09	967	3.4	50.2	46.4	9.5	31.7	27.2	19.1	12.5	22.14
Crusader	10.71	857	2.7	52.3	45.0	34.4	25.8	12.8	13.6	13.4	19.17
Excel	10.05	804	3.0	47.7	49.3	24.9	19.9	32.4	7.0	15.8	19.75
Jupiter	9.73	778	1.6	42.1	56.3	51.1	23.3	14.9	3.7	7.0	22.14
Escarlata	7.37	590	6.4	29.3	64.3	20.0	10.2	20.0	24.5	25.3	21.38
Average	12.65	1,012									
LSD[3]	4.20	336									
C.V.	23.3%	23.3%									

Table 1. Yield, maturity, and fruit size percent for 15 bell pepper varieties – Galt, CA 2005
[1]Values represent the average of four replications
[2]Pepper fruit sizing data: Jumbo: >8.5 oz; Extra-large: 7 – 8.5 oz; Large: 6 – 7 oz; Medium: 5.3 – 6 oz; Small: <5.3 oz
[3]Least significant difference at 5% significance level

Managing Rain-Damaged Crops

The recent rains have caused serious damage to some newly seeded alfalfa and garbanzo bean fields. What started out as a dry winter allowed growers to extend their alfalfa planting time into December which is unusually late and not recommended. Even November plantings were without moisture until December rains came to germinate everything at one, late time. The continual rains and saturated soil, lasting weeks, are causing seedling plants to die primarily from fungal diseases. Most of the loss I am seeing is Pythium damping off disease or a root collapse due to prolonged anaerobic soil conditions (soil depleted of oxygen). Recent visits to new alfalfa plantings in the area are showing stand losses of 50% and in specific areas where water stood longer up to 100% loss is occurring. The alfalfa fields that were planted in September and followed with an irrigation to bring up the crop were a better call this year. Visits to those fields show deep-rooted and well established plants in reasonably good shape, able to endure problems associated with wet soils.

Winter-planted garbanzo beans and wheat, although impacted by all the rains, are fairing much better and surviving. The exceptions are the low-lying and poorly drained areas of the field where water was standing for 3-5 days. These areas are really hurt and show little hope of full recovery or a normal crop yield. Wheat and garbanzo beans are cool season plants and better adapted to winter conditions than is seedling alfalfa.

My concern is that what we see now may not be the worst case scenario. Continued rains and wet soils coupled with warming temperatures on the horizon are a recipe for more disease problems to develop. The already weakened plants need time to recover and initiate new root growth to withstand disease pressures; without that occurring the plants will slowly disappear.

Ways to manage water-damaged crops :

- Avoid herbicides until soil/water relationship is in balance and plants show signs of new growth.
- Small amounts of top-dress N fertilizer will help stimulate root growth if soil fertility is low.
- Applying too much nitrogen before plants start to grow can do more damage than good.
- Not usually a problem in seedling alfalfa, but be aware of weevil populations feeding on new growth.
- Garbanzo beans should be cultivated to air out the soil if the opportunity exists.
- Delay the first irrigation as long as roots are growing into adequate soil moisture. However, a damaged root system will need water sooner---just not as much!
- Reseeding into young alfalfa can be successful if done early before crop or weeds become established. (Drilling is a preferred method of reseeding.)
- Seedling alfalfa populations falling below 8-10 plants ft^2 are too sparse and are candidates for reseeding.
- Hold off on the first harvest of alfalfa as long as possible. This allows for roots to develop size and build reserves needed for summer harvest.

Mick Canevari
Farm Advisor

(continued from pg 5)

Frost, and how to prevent damage by cold temperatures, are always topics in the back of the mind of most growers during that early push. Four things to remember are:

1) Low areas are susceptible to cold air accumulation resulting in frost.
2) Windless nights of low humidity and low dew points are major concerns. Some protection can be achieved with wet soil that is cultivated anytime but the day before or by maintaining low cover crop areas.
3) Delayed and/or double pruning can delay budbreak and avoid cold conditions for another 10 to 14 days; and if you are going to drip irrigate to “frost protect” you need to apply the water at least 24 to 36 hours ahead to allow some heart accumulation the day before in order for it to do <u>any</u> (?) good.
4) Copper sprays or bactericides do not prevent freeze damage.

In general things look to be off to a reasonably good start, but there is a ways to go. If you do have questions give us a call, visit our web site (we are trying to keep it updated), or attend one of the upcoming meetings. Good luck for now.

Paul Verdegaal
Farm Advisor

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Notes from the Field

February 2006