Imperial County Agricultural Briefs

Features From your Farm Advisors

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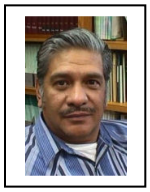
Page

Hay Mineral Content



Juan N. Guerrero

As part of a biosolids project that we undertook about ten years ago, we evaluated the mineral uptake of alfalfa and sudangrass grown at UCDREC. The metals analyzed were: arsenic As, cadmium Cd, chromium Cr, copper Cu, lead Pb, mercury Hg, molybdenum Mo, nickel Ni, selenium Se, zinc and Zn. The mean mineral values for a three year trial are found in Table 1.

The only mineral deficiency that we found was Cu. Cu alone in both alfalfa and sudangrass is adequate. However in the rumen, high levels of Mo bind Cu; the proportion should be greater than 6:1 (Cu:Mo).

Table 1. Mineral content of alfalfa and sudangrass grown at UCDREC, 2003.

Metal	alfalfa hay ppm	sudangrass hay ppm	Max. tolerable ppm (NRC, 2000)
As	4.45	6.49	50
Cd	1.17	0.73	0.5
Cr	0.47	1.80	1000.0
Cu	16.32	20.31	100
Pb	3.2	2.09	30
Hg	0.40	1.00	2
Mo	10.32	10.84	10
Ni	0.14	0.31	50
Se	0.21	0.17	2
Zn	35.84	34.92	500

Source: 2003 M.Sci. thesis UABC, Alecsandro Rufino dos Santos.

Web-Spinning Spider Mite Management in Alfalfa Seed Production

Eric T. Natwick

Web-spinning spider mites are an annual problem for alfalfa seed producers the low desert production areas of Southern California and Arizona. Spider mites insert needle-like mouthparts into leaves, removing plant sap and causing chlorotic spot stippling on leaves. Severe feeding damage may turn leaves brown and desiccation causing defoliation. Damage usually starts in the lower plant canopy and moves upward as the mites move to new leaves. Severe feeding damage reduces alfalfa seed production. Several spider mite species are found in low deserts:

- Twospotted spider mite (Tetranychus urticae Koch)
- Carmine spider mite (T. cinnabarinus Boisdival)
- Strawberry mite (T. turkestani Ugarov & Nikolski)
- Desert spider mite (T. desortorum Banks)

A management plan should be developed prior to the start of alfalfa seed production. The plan should include the following components:

- Decision of returning to hay production, seed production or terminating the alfalfa after seed harvest (returning to hay production greatly limits choices of acaricides (miticides)
- Survey surrounding crops and weeds as potential sources of spider mites
- Dust mitigation
- Abatement of sources of spider mites
- Scouting plan for spider mites detection and treatment decisions
- Application of miticides when needed to prevent seed yield losses.

Crops such as melons and many weed species can harbor web-spinning spider mites and may become a source of infestation for an alfalfa seed crop. Also, spider mites may be harbored on the lower leaves of alfalfa plant throughout the year. Some insecticide applications, such as organophosphate or pyrethroids for lygus bug and stink bug control, can flare spider mite populations via destruction of predators or through hormoligosis (chemical stimulation of increased egg production). Many predators feed on spider mites including western flower thrips, minute pirate bugs, big eyed bugs and predaceous mites.

Dust from field roads drifting onto alfalfa plants favors web-spinning spider mite flare-ups. Water or treat field roads to minimize dust from vehicle traffic. Post speed limit signs (5 mph) on field roads.

Abatement of sources of spider mites is important to reduce the potential for migration into the alfalfa seed field. Abatement should include weed control and if possible removal or treatments of spider mites in surrounding crops such as melons.

Alfalfa seed production fields should be scouted twice weekly for spider mites beginning early season and continuing until the crop is prepared for harvest. Fields should also be monitored for spider mite predators and for other pests in the field. Proper scouting will lead to accurate assessments of spider mite pressure versus the predator population levels that may result in reduced use of chemicals through improved timing of applications. It may be practical to treat only portions of a field.

When web-spinning spider mites are present in an alfalfa field prior to seed production, a miticide spray may be needed to prevent damage leading to reduction of seed production. Stressing the alfalfa for water can stimulate bloom, but also favors the build-up of spider mites. Historical knowledge of spider mite problems influences whether a grower controls spider mite populations immediately, or delays treatment for a while. Treat fields before populations reach damaging levels to maximize the efficacy of available chemicals. When possible, spot or strip treat localized spider mite infestations. Use ground application equipment when possible (prior to bee placement) to improve coverage. To prevent spider mite problems consider including a miticide with the first insecticide application for lygus bugs. There is historical research trial evidence indicating that an application with a highly efficacious miticide early in the season with the first lygus bug treatment can prevent damaging population levels of spider mites for the remainder of the seed production season. Miticides registered for alfalfa seed production work best when used against low populations and none can resolve a significant spider mite problem.

Powdery Mildew (*Podosphaera xanthii)* on Melons

Donna Henderson

History. Powdery mildew has been a concern to farmers for years, and some management techniques such as sulfur have been around for just as long. In fact, this pathogen was among the first studied plant pathogens that helped to bring the importance of studying plant diseases to public awareness, and subsequently bring the field of plant pathology to fruition. In September 22nd 1847, observations of powdery mildew disease and control measures were first published by Mr. Tucker in Gardeners 9 Journal. Mr. Tucker was an uneducated gardener of the Margate, Kent, England grape vineyards who noticed the leaves in the vineyards were overcome by a white fluffy growth (Large, E.C., 2000). At the time, light microscopes were very new and popular, and it was common for citizens to own and use microscopes for leisure and pastime. Mr. Tucker looked at the organism under his microscope and decided that this growth was the cause of the disease. Mr. Tucker had previously tried sulfur and lime for control of mildew on peach trees, and tested it successfully on this new mildew disease he had found in the vineyards. Following this discovery by Mr. Tucker, the fungal organism causing powdery mildew of grapes was identified and named by Reverend J. Berkeley as *Oidium tuckeri* in the Gardeners 9 Chronicle in 1847. Although primarily identified as causing powdery mildew problems on grapes in the 1800's, various powdery mildew pathogens have been identified since then. There are many different types of plant parasitic powdery mildew fungi that can cause problems on various crops, including cucurbits.

Pathogen, Occurrence, Symptoms. Powdery mildew of melon (*Cucumis melo*) is caused by *Podosphaera xanthii* (syn. *Sphaerotheca fuliginea*), and occurs most commonly in early to mid summer on cucurbits here in the Imperial Valley. *P. xanthii* is less common in watermelon than on other cucurbits (UC-IPM). Currently, *P. xanthii* races 1, 2 US and S have been identified in the lower deserts of California and Arizona (Coffey et al., 2006; J.D. McCreight et al., 2005). Various locations within California were tested for presence of fungicide resistance in 2006 (M.D. Coffey, pers. comm.). *P. xanthii* isolates were found to have resistance to different classes of fungicides: Topsin (benzimidazole), Rally (DMI) and Flint (strobilurin) (M.D. Coffey, pers. comm). In 2006 and 2007, field samples from Fresno and Merced counties were identified to have fungicide resistance to both Flint and Rally (M.D. Coffey, pers. comm.). When race S was identified in Imperial Valley in 2003, commercially available hybrid varieties such as Impac with race 1 and 2 resistance were susceptible to race S (McCreight et al., 2005; M.D. Coffey, pers. comm). Current studies are focused on characterizing resistance to race S in a vegetable type melon from India and transferring resistances to race 1, 2 US and S to western shipping type cantaloupe (J.D. McCreight, pers. comm.).

Optimal conditions for powdery mildew growth are temperatures between 60°F to 80°F and shady conditions (UC-IPM). *P. xanthii* prefers dry conditions, with relative humidity of 50 to 90 percent for spore production (UC-IPM). Although relative humidity doesn't often reach those levels consistently in the desert, dense foliage and irrigation may create microclimates that favor powdery mildew development. However, presence of water on the plant surface may wash off and/or inhibit the germination of the fungal spores. *P. xanthii* grows on the outside of leaves, first appearing as a small white growth, eventually becoming a layer of white fluffy mycelium and spores on the upper or lower side of leaves. *P. xanthii* does not grow systemically (able to spread through the inside of the entire plant), instead this fungus prefers to produce mycelium on the outer surface, and penetrate the leaves with specialized feeding cells called haustoria. The fungus will then produce spores in the absence of free water; spore production gives the leaves the characteristic powdery appearance. The spores are spread to new infection sites by wind. After the fungus has extracted nutrients, the plant cells die, causing the leaves to become brown and papery (UC-IPM). Fruit produced by the plant may accumulate less sugar, have reduced yield, and shortened production times (UC-IPM).

Management Options. There are commercially produced varieties that are bred for resistance that may be planted. However, although there are commercially available varieties of powdery mildew resistant melons, they are only available against races 1 and 2. Currently, there are no known U.S. commercial varieties with resistance to race S (J.D. McCreight, pers. comm).

Protective fungicide treatments are very successful at preventing the development of powdery mildew on melon. Sulfur is a treatment that has been used for hundreds of years, in fact since the first identification of the causal disease pathogen in grapes in 1847. If sulfurs are used, it is important to apply sulfur when *temperatures are below 85°F* to avoid burn and damage to leaf tissue. Some varieties of cucurbits are more susceptible to sulfur injury than others, therefore, make sure to check varietal sensitivity prior to applying sulfur. Should plants develop powdery mildew symptoms, eradicant fungicides should be used after an infection has established. Regardless of the fungicide used, it is imperative to rotate fungicide classes to prevent the development of resistant races. Additionally, be aware that fungicide resistant races exist in California (UC-IPM) as well as new races; therefore a treatment or cultivar that has worked in the past may now be ineffective.

CIMIS REPORT

Khaled Bali and Steve Burch*

California Irrigation Management Information System (CIMIS) is a statewide network operated by California Department of Water Resources. Estimates of the daily reference evapotranspiration (ET_o) for the period of June 1 to August 31 for three locations in the Imperial County are presented in Table 1. ET of a particular crop can be estimated by multiplying ET_o by crop coefficients. For more information about ET and crop coefficients, contact the UC Imperial County Cooperative Extension Office (352-9474) or the IID, Irrigation Management Unit (339-9082). Please feel free to call us if you need additional weather information, or check the latest weather data on the worldwide web (visit http://tmdl.ucdavis.edu and click on the CIMIS link).

Table 1. Estimates of daily Evapotranspiration (ET_o) in inches per day

Station	June		July		August	
	1-15	16-30	1-15	16-31	1-15	16-31
Calipatria	0.39	0.40	0.39	0.38	0.35	0.32
El Centro (Seeley)	0.36	0.38	0.38	0.37	0.32	0.29
Holtville (Meloland)	0.38	0.39	0.39	0.38	0.34	0.31

* Irrigation Management Unit, Imperial Irrigation District.