Backcountry Horsemen of California 2018 Rendezvous

Weeds and Grasses

Devii Rao, Livestock & Natural Resources Advisor
UC Cooperative Extension

April 13 & 14, 2018
Paso Robles Event Center, Paso Robles, CA

Yellow Starthistle

Not flowering yet!

Flower initiation, flower expansion, and full bloom stages

Yellow Starthistle

Tocalote/Maltese Starthistle

©2013 Jean Pawek

©1998 California Academy of Sciences

©2007 Neal Kramer

Milk Thistle

Italian Thistle

Bull Thistle

Purple Starthistle

©2005 Luigi Rignanese

©2016 Richard Spellenberg

Milk Thistle

©1995 Saint Mary's College of California

Italian Thistle

©1995 Saint Mary's College of California

Bull Thistle

©2008 Thomas Stoughton

Purple Star Thistle

©2005 Luigi Rignanese

Plants Poisonous to Horses

http://anrcatalog.ucanr.edu/pdf/8398.pdf

Making a Difference for California
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Publication 8398 | January 2011

Livestock-Poisoning Plants of California

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Poisonous plants cause significant losses of livestock every year. A successful livestock operator must know which poisonous plants occur on a given range or pasture and how they can be controlled or avoided. This publication shows which plants are poisonous, tells how they affect stock, and suggests ways to reduce losses from poisoning.

Undesirable effects may result from a single ingestion of a large amount of a poisonous plant, but some plants are so toxic that very small amounts may result in severe disease or death. Other plants cause chronic poisoning only after ingestion over weeks or months. The later situation may result in clinical signs long after the exposure to the toxic plant material, and treatment may no longer be possible.

With few exceptions, livestock will not eat poisonous plants unless forced to by hunger. The single most important way to prevent poisoning is to use proper range and pasture management practices to provide ample forage, encouraging consumption of nontoxic plants. Areas infested with poisonous plants should be avoided when trailing, holding, or unloading animals. Supplemental feed may protect stock if these conditions cannot be avoided, but there are circumstances (for example, herbicide applications) that may change palatability or increase toxicity in some plants. If toxic weeds are embedded in alfalfa cubes or included in total mixed rations, animals may not be able to avoid ingestion of them.

Many poisonous plants may be controlled with herbicides. Often, however, the uneven distribution

Livestock-Poisoning Plants in California

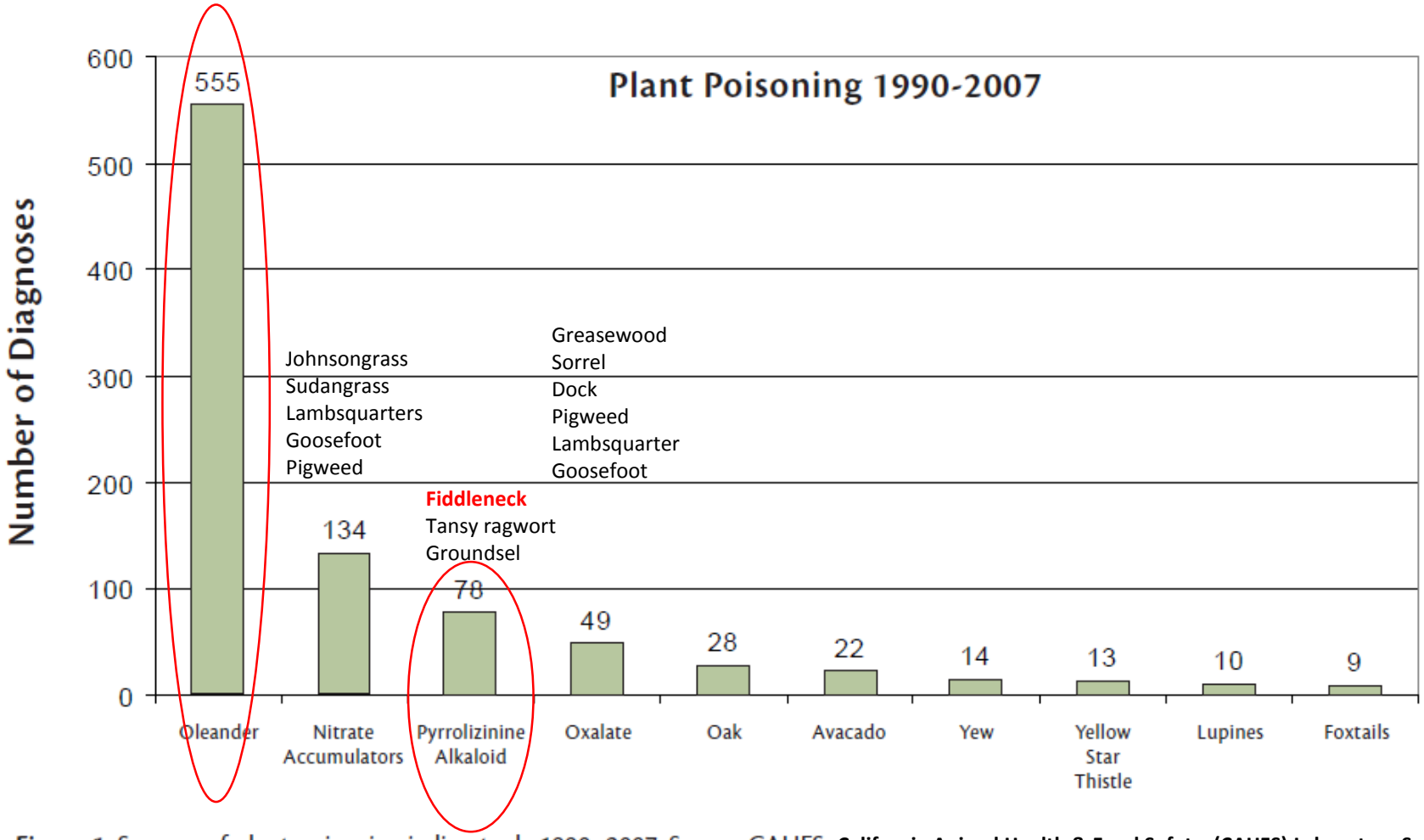

Figure 1. Sources of plant poisoning in livestock, 1990–2007. *Source:* CAHFS. **California Animal Health & Food Safety (CAHFS) Laboratory System**

Oleander: Toxin – Cardiac Glycosides

Organ or systems affected: Heart
Signs of poisoning in horses: **Sudden death**, depression, salivation, weakness, irregular heartbeat, diarrhea
Affects cattle, sheep, horses, goats

Toxic dosage for cattle and sheep and 5 leaves. For horses it's 20-30 leaves. Green and dry leaves are toxic.

Fiddleneck: Toxin – Pyrrolizidine alkaloids

Fiddleneck – is also a native plant

Organ or systems affected: Liver
Signs of poisoning in horses: Chronic appetite loss, **weight loss**, walkabout disease, head pressing, rectal straining
Affects cattle and horses most. Sheep & goats are also affected but not as much.

Poison Hemlock: Toxin – Coniine (alkaloids)

Organ or systems affected: Nervous, reproductive
Signs of poisoning in horses: sudden death, nervousness, trembling, weakness, coma, birth defects
Affects cattle, sheep, horses, goats

Yellow Starthistle: Toxin – Lactones

Organ or systems affected: Nervous
Signs of poisoning in horses: weight loss, abnormal curling of lips (chewing disease), yawning
Affects cattle, sheep, horses, goats

Herbicide
Cattle Grazing
Mowing

UC Weed Report - http://wric.ucdavis.edu/information/natural%20areas/wr_C/Centaurea_solstitialis.pdf

Yellow Starthistle - Herbicide

Early seedling stage

Rosette stage

Bolting. *Bolting is a stage of vigorous shoot growth during the time of greatest light availability.*

Photo: http://cal-ipc.org/ip/management/pdf/YSTBiology.pdf

Aminopyralid (Milestone) is the best option to control yellow starthistle. Spray from early seedling to rosette stage.
Clopyralid (Transline) is also very effective. Spray from seedling to mid-bolting stage.

Yellow Starthistle

Bolting. *Bolting is a stage of vigorous shoot growth during the time of greatest light availability.*

Photo http://cal-ipc.org/ip/management/pdf/YSTBiology.pdf

Spiny stage – too late to graze!

Graze from time when plant has bolted to right before the spines come out on the heads.

Yellow starthistle - Mowing
Spiny Stage Versus Flowering Stage

Spiny stage – you could mow when all plants are in this stage, but it's safer if you wait to mow until you see flowers.

Flower initiation, flower expansion, and full bloom stage – mow now!

Mow when 2-5% of the seedheads are blooming.

California Animal Health & Food Safety (CAHFS) Laboratory System

CAHFIS Locations

UC Davis Lab

Tulare Lab

Horse Necropsy: $120+$94.90 rendering fee. Total = $215

Submit 3 things

1) Animal
2) Suspected plants
3) Water sample

Bluegreen Algae in Water Trough

https://www.agweb.com/article/controlling_algae_in_livestock_water_tanks_naa_university_news_release-naa-university-news-release/

CalFlora: www.calflora.org

Calflora

1 matching record.

Searching for: name like poison hemlock

Click on the **Scientific Name** to see a Taxon Report.

Conium maculatum

invasive non-native
Perennial herb

Poison hemlock

© 2008 Keir Morse

© 2011 Louis-M. Landry

© 2009 Neal Kramer

Suggested Citation

Calflora: Information on California plants for education, research and conservation. [web application]. 2017. Berkeley, California: The Calflora Database [a non-profit organization].
Available: http://www.calflora.org/ (Accessed: Aug 06, 2017).

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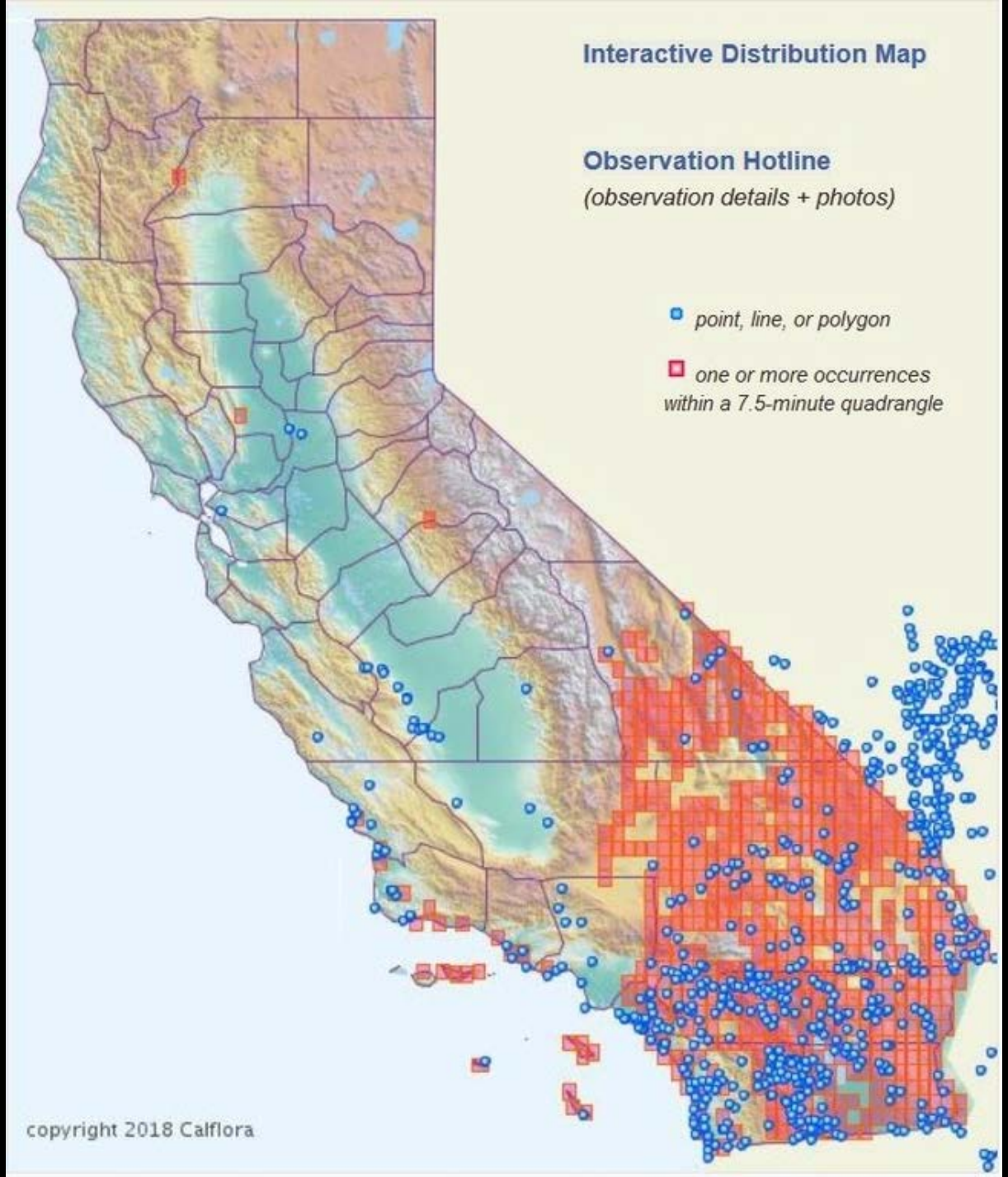
Saharan Mustard

©2016 Keir Morse

Photo: UC Weed Report

- Grows to 4 ft tall or more.
- Exists as a basal rosette until flowering stems develop at maturity.
- Basal leaves deeply pinnate-lobed, typically with more lobed pairs (6 to 14 pairs) than most mustard species.
- Inflorescences in racemes with 4-petaled pale yellow flowers (4 to 8 mm long) and long linear fruits (1.5 to 3.5 inches long).
- Mature fruits strongly constricted between the seeds and appearing beaded. Fruits open from the base to release seeds.

Plant Description from
UC Weed Report


Interactive Distribution Map
Observation Hotline
(observation details + photos)
point, line, or polygon
one or more occurrences within a 7.5-minute quadrangle
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Effective Herbicides for Controlling Central Coast Rangeland Weeds: Plants

1. Bull thistle
2. Cocklebur
3. Fiddleneck
4. Foxtail
5. French broom
6. Goatgrass
7. Himalaya blackberry
8. Italian thistle
9. Medusahead
10. Milk thistle
11. Purplestar thistle
12. Tumbleweed
13. Whitetop
14. Yellow starthistle

Table 1. Common Central Coast Rangeland Weeds

Plant Species	Herbicides Options Approved for use on California Rangelands	Rangeland Herbicides Known to be Effective
Bull thistle (*Cirsium vulgare*)	2, 4-D (Several names) Aminopyralid (Milestone) Clopyralid (Transline) Dicamba (Banvel, Clarity) Triclopyr (Garlon 3A/Garlon 4 Ultra) Chlorsulfuron (Telar) Imazapyr (Arsenal, Polaris)	Milestone, Transline, Capstone (=Milestone + Garlon), Garlon, Roundup (Kyser, unpublished) 2,4-D is often used because it is inexpensive. However, it is not as effective as other herbicides.
Bull thistle weed report:	http://wric.ucdavis.edu/information/natural%20areas/wr_C/Cirsium_vulgare.pdf	
Cocklebur (common and spiny cocklebur) (*Xanthium strumarium*) (*Xanthium spinosum*)	2, 4-D (Several names) Aminopyralid (Milestone) Clopyralid (Transline) Dicamba (Banvel, Clarity) Fluroxypyr (Vista XRT) Triclopyr (Garlon 4 Ultra, Remedy Ultra) Glyphosate (Roundup, Accord XRT II, and others) Imazapyr (Arsenal, Polaris) Sulfosulfuron (Outrider)	Aminopyralid (Milestone) Clopyralid (Transline)
Cocklebur weed report :	http://wric.ucdavis.edu/information/natural%20areas/wr_X/Xanthium_spinosum-strumarium.pdf	
Fiddleneck (Menzies and coast fiddleneck) (*Amsinckia menziesii*) (*Amsinckia menziesii var. intermedia*)	Aminopyralid (Milestone) Glyphosate (Roundup, Accord XRT II, and others) Chlorsulfuron (Telar) Imazapyr (Arsenal, Polaris) Sulfosulfuron (Outrider) Hexazinone (Velpar DF)	Aminopyralid (Milestone) Chlorsulfuron (Telar)
Fiddleneck weed report:	http://wric.ucdavis.edu/information/natural%20areas/wr_A/Amsinckia.pdf	

Effective Herbicides for Controlling Central Coast Rangeland Weeds: Herbicides

1. Triclopyr (Garlon 3A/Garlon 4 Ultra, Remedy Ultra,Pathfinder II)
2. Aminopyralid (Milestone)
3. Glyphosate (Roundup, Accord XRT II, and others)
4. Chlorsulfuron (Telar)
5. Clopyralid (Transline)
6. 2, 4-D (DMA4 IVM, Weedar 64 and many others)

Table 2. Commonly Used Rangeland Herbicides, Including When and How to Use Them

Chemical Name/Product Name[1]	Price[2*]	Registered for use on California rangelands[3]	Requirements to Purchase/Spray Herbicide[3]	Preemergent/ Postemergent[1]	Best time to spray[4]	Targeted Plants[4]
Triclopyr (Garlon 3A/Garlon 4 Ultra, Remedy Ultra, Pathfinder II)	$70/gallon	Yes	Operator ID #	Postemergent	Spray after all of the weed seed has germinated, but before the plants get big.	Kills broadleaves, but not grasses Kills clovers[5]
Aminopyralid (Milestone)	$300/gallon	Yes	Operator ID #	Preemergent and postemergent	January - March	Kills thistles and legumes, and some other broadleaves, but not grasses Kills clovers[5]
Glyphosate (Roundup, Accord XRT II, and others)	$21/gallon	Yes	Operator ID #	Postemergent	Spray after all of the weed seed has germinated, but before the plants get big.	Kills any green vegetation. Tree leaves can be sprayed, but it will not be effective if sprayed on tree trunks.

Effective Herbicides for Controlling Central Coast Rangeland Weeds: Herbicides - Grazing/Pet Restrictions

Chemical Name/Product Name[1]	Grazing/Pet Restrictions[5]
Triclopyr (Garlon 3A/Garlon 4 Ultra, Remedy Ultra, Pathfinder II)	"Grazing green forage: There are no grazing restrictions for livestock or dairy animals on treated areas...Haying (harvesting of dried forage): Do not harvest hay for 14 days after application...Slaughter Restrictions: During the season of application, withdraw livestock from grazing treated grass at least 3 days before slaughter...Livestock Use of Water from Treatment Area: There are no restrictions on livestock consumption of water from the treatment area." **Herbicide Label: https://s3-us-west-1.amazonaws.com/www.agrian.com/pdfs/Garlon_3A_Label1i.pdf**
Aminopyralid (Milestone)	"Grazing and Haying Restrictions: There are no restrictions on grazing or grass hay harvest following application of Milestone at labeled rates. Cutting hay too soon after spraying weeds will reduce weed control. Wait 14 days after herbicide application to cut grass hay to allow herbicide to work. Do not transfer grazing animals from areas treated with Milestone to areas where sensitive broadleaf crops occur without first allowing 3 days of grazing on an untreated pasture. Otherwise, urine and manure may contain enough aminopyralid to cause injury to sensitive broadleaf plants...For applications on rangeland and permanent grass pastures (not harvested for hay) and non-cropland areas, do not enter or allow worker entry into treated areas until sprays have dried...Grazing Poisonous Plants: Herbicide application may increase palatability of certain poisonous plants. Do not graze treated areas until poisonous plants are dry and no longer palatable to livestock...Hay from grass treated with Milestone within the preceding 18-months can only be used on the farm or ranch where the product is applied unless allowed by supplemental labeling." Check label for specific restrictions on moving hay, or using hay for silage, etc. **Herbicide Label: https://s3-us-west-1.amazonaws.com/www.agrian.com/pdfs/Milestone_Label1h.pdf**
Glyphosate (Roundup, Accord XRT II, and others)	"DOMESTIC ANIMALS: This product is considered to be relatively nontoxic to dogs and other domestic animals; however, ingestion of this product or large amounts of freshly sprayed vegetation may result in temporary gastrointestinal irritation (vomiting, diarrhea, colic, etc.). If such symptoms are observed, provide the animal with plenty of fluids to prevent dehydration. Call a veterinarian if symptoms persist for more than 24 hours...Do not feed or graze turfgrass grown for seed or sod production for 8 weeks following application...If application rates total 4.5 pints per acre or less, no waiting period between treatment and feeding or livestock grazing is required. If the rate is greater than 4.5 pints per acre, remove domestic livestock before application and wait 8 weeks after application before grazing or harvesting." **Herbicide Label: https://s3-us-west-1.amazonaws.com/www.agrian.com/pdfs/Roundup_Custom_Label2.pdf**

Anything to include from Glenn Nader pubs???

LIVESTOCK & RANGE NEWS

UCCE Research and Workshops in San Benito, Monterey, and Santa Cruz Counties

Effective Herbicides for Controlling Central Coast Rangeland Weeds

Author: Devii R. Rao

Published on: August 1, 2017

Do you have yellow starthistle, Italian thistle, Himalaya blackberry, white top, or other common Central Coast rangeland weeds on your ranch? If so, you may be wondering which herbicides are most effective, how much they cost, what is required to purchase and spray a particular herbicide, when to spray, whether the herbicide affects grasses or clovers, and if the herbicide is safe for your livestock and pets. Many Central Coast rangeland landowners have been asking these same questions. So, I compiled this information in two tables. **Table 1** shows some of our common rangeland weeds and different herbicide treatment options. **Table 2** lists six of the most commonly used rangeland herbicides, and answers questions about cost, when to spray, purchasing requirements, affected plants, and grazing/pet restrictions. Both tables are attached as PDFs at the bottom of this blog post. All of this information is already available from a variety of sources, but I have put it together in two easy to use reference tables. The tables are self-explanatory for the most part, but the information below may clarify a few things.

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Recent Posts

ANR Blogs

- Effective Herbicides for Controlling Central Coast Rangeland Weeds
- Focus on the Beef Cow - Workshop
- New Grassland Restoration Manual Available
- Healthy Livestock - Healthy Land: July 8 at 101 Livestock
- What do you need to know to keep your operation successful?

Recent Comments

- This is great info, thanks Devii!

Grasses

Grasses are Really Important

Corn

Rice

Cattle & Horses

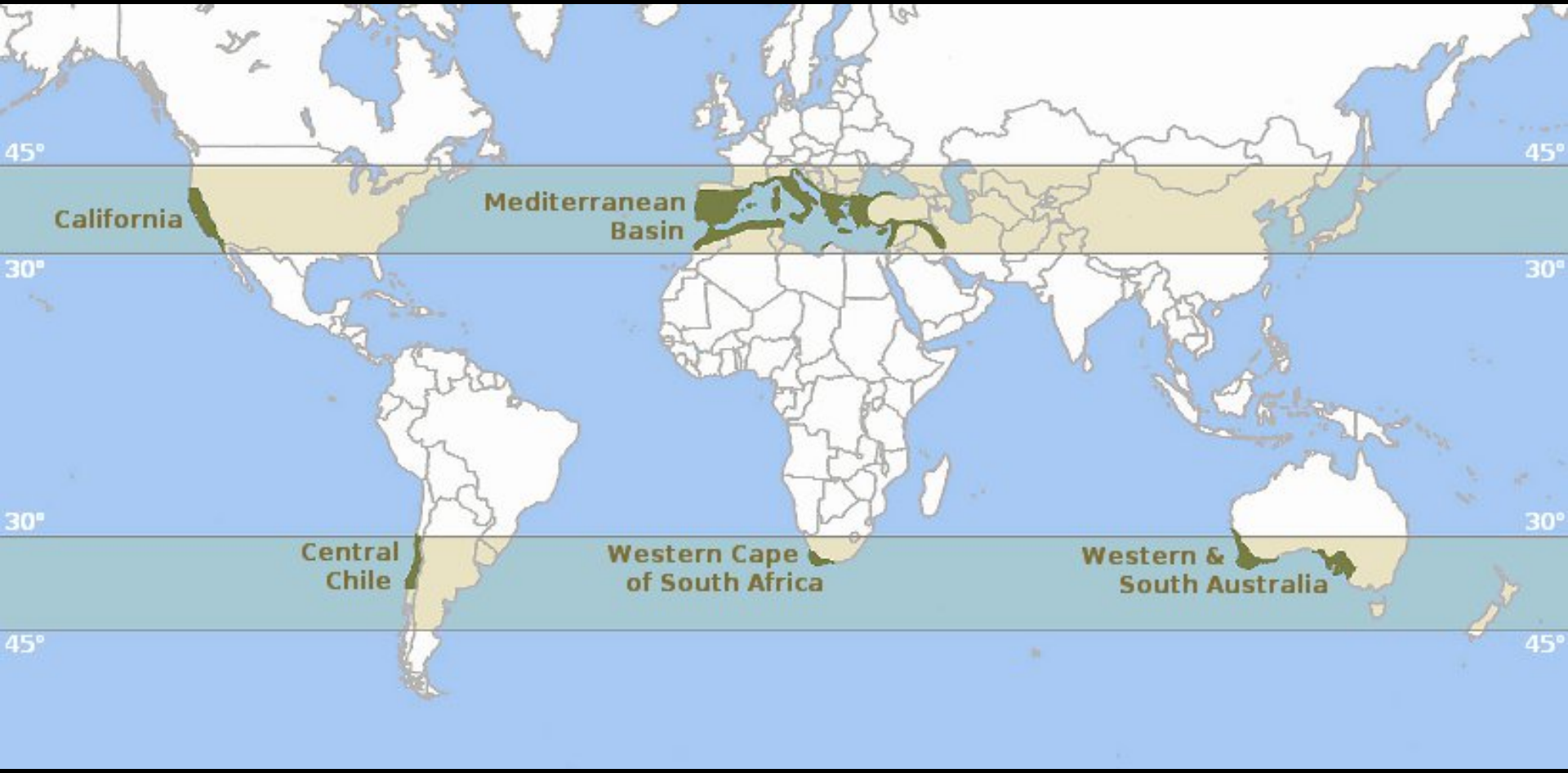
Western Meadowlark

Grass Stats from *California Grasslands Ecology & Management Book*

- About ¼ of California is covered by grass-dominated vegetation.
- Poaceae is the 4th largest flowering plant family in the world with 11,000 species worldwide.

- California has 524 grass species.
- About 45% of grasses in California are introduced and about 55% are native.
- 37 grass species occur only in California.
- 51 California native grasses are annual and 240 are perennial.

Native v. Non-Native
Mediterranean Ecosystems



Grass-like Plants

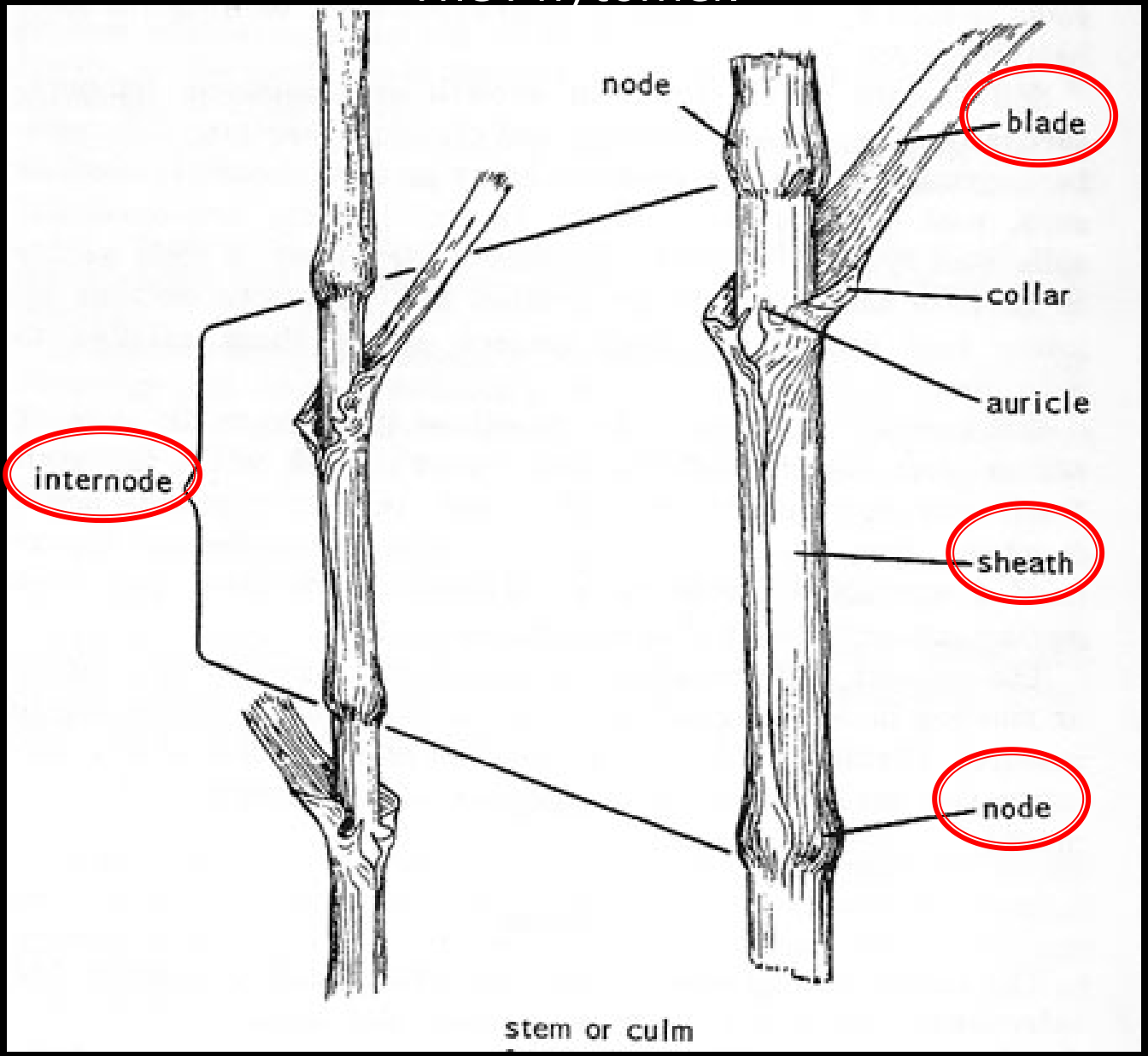
Rush: *Juncus acutus*

©2018 Dr. Amadej Trnkoczy

Sedge: *Carex alma*

©2008 Steve Matson

What makes a gras a grass?
The Phytomer.



http://www.namethatplant.net/glossary_grass.shtml

Annual v. perennial

Perennial Grass Growth Forms

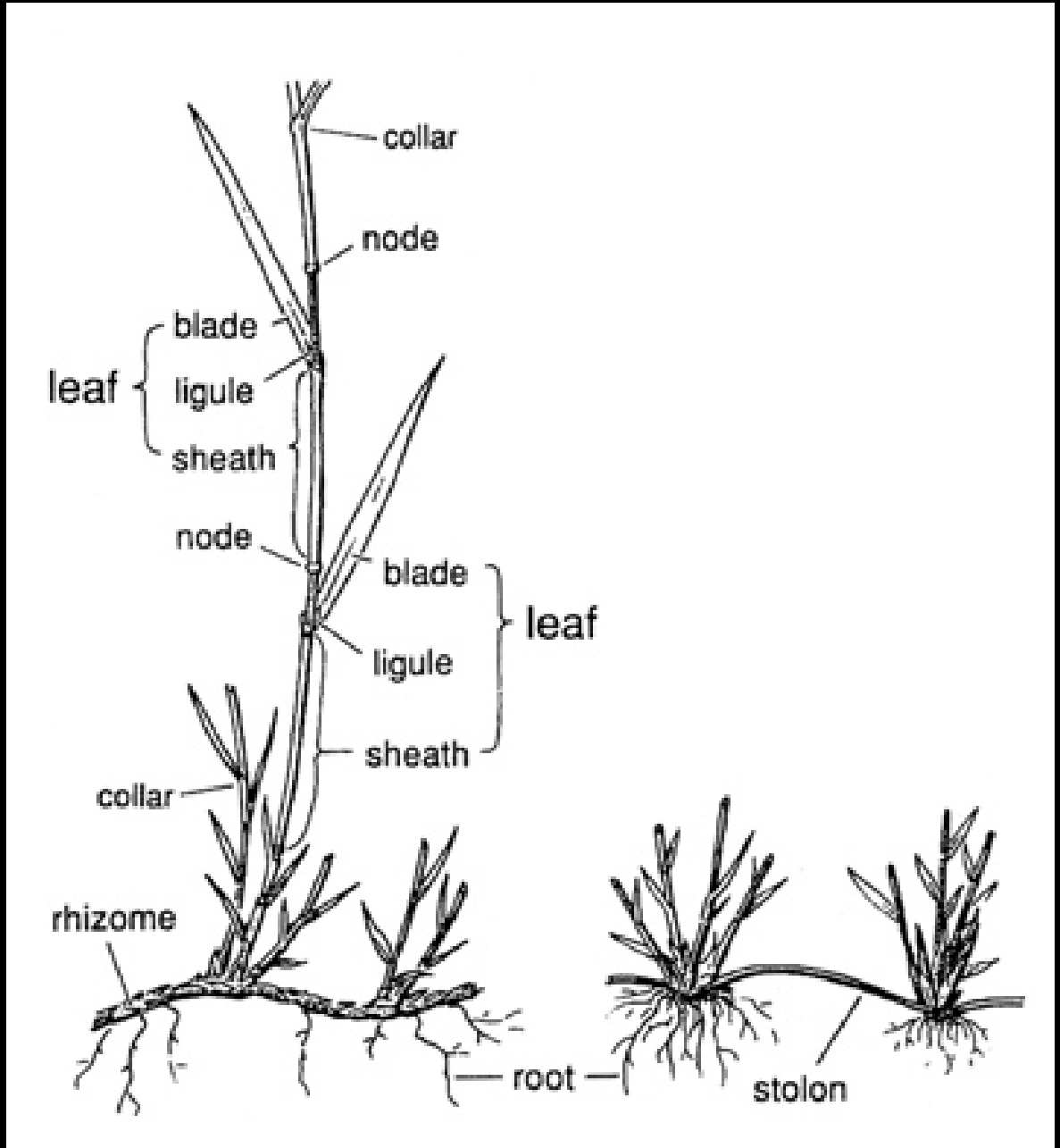
Cespitose (bunch grasses)

Rhizomatous (sod-forming)

Image From Jepson Manual

Intercalary meristems are above each node and at the base of each leaf blade.

Compare to apical meristem at the apex or top of the plant.



Field Guide for Common California Rangeland and Pasture Plants

Larry Forero, University of California Cooperative Extension Livestock and Natural Resources Advisor, Shasta and Trinity Counties; **Josh Davy,** University of California Cooperative Extension Livestock and Natural Resources Advisor, Glenn, Colusa and Tehama Counties; **Sheila Barry**, University of California Cooperative Extension Livestock and Natural Resources Advisor, San Francisco Bay Area; **James Bartolome**, Professor, Department of Environmental Science, Policy and Management, University of California, Berkeley, and **Stephanie Larson**, Livestock and Range Management Advisor, Sonoma County.

Available at http://ceshasta.ucanr.edu/files/235849.pdf

Purple Needlegrass *Stipa pulchra* – bunchgrass

What I look at for *Stipa Pulchra*:

- Bunch grass
- Really long, smooth awns
- Rough leaves
- Hairy ligules

Livestock forage value: The plants are palatable during fall green, which can occur prior to annual grass germination, but become course and unpalatable as the season progresses. Plants may need protection from grazing during flowering to provide for seeds and nutrient storage in the crown.

Stipa pulchra - awns

Foxtail

Livestock forage value: Both barley species are desirable forage when vegetative. However, they are one of the earlier maturing annuals and produce abrasive awns on their seed heads which make them very unpalatable and can lead to eye and mouth problems in livestock.

Hordeum marinum

Hordeum murinum

Livestock forage value: Ripgut brome is very palatable when vegetative and growing. The long awns on its seed head can cause eye and mouth problems for livestock.

Livestock forage value: Red brome is fairly palatable when vegetative and growing. The long awns on its seed head can cause eye and mouth problems for livestock.

Ripgut Brome - *Bromus diandrus*

Red Brome - *Bromus madritensis subsp. rubens*

Soft Chess - *Bromus hordeaceous*

Cattle will readily consume softchess during the green feed season.

Rye Grass - *Festuca perennis*

Livestock forage value: Excellent forage species.

©2011 Zoya Akulova

©2017 Gary McDonald

Slender Oat - *Avena barbata*

©2009 Keir Morse

ivestock forage value: The forage value is similar to cultivated oats. It is most nutritious and palatable when green.

Wild Oat - *Avena fatua*

©2017 Gary McDonald

RANGELAND MANAGEMENT SERIES Publication 8022

Annual Rangeland Forage Quality

MELVIN GEORGE, Extension Range Specialist, Department of Agronomy and Range Science, University of California, Davis; **GLENN NADER,** UC Cooperative Extension Farm Advisor, Yuba-Sutter-Butte Counties; **NEIL MCDOUGALD,** UCCE Farm Advisor, Fresno-Madera Counties; **MIKE CONNOR,** Superintendent, UC Sierra Foothill Research and Extension Center; and **BILL FROST** UCCE Farm Advisor, Amador-Calaveras-El Dorado Counties.

UNIVERSITY OF CALIFORNIA
Agriculture
and Natural Resources
http://anrcatalog.ucdavis.edu

California Rangelands Research and Information Center
http://agronomy.ucdavis.edu/calrng/range1.htm

Matching the nutrient demands of livestock with the nutrients supplied by range forage is a balancing act for a considerable portion of each year. The quality of range forage varies with plant species, season, location, and range improvement practices. Range forage is optimal for livestock growth and production for only a short period of the year. Early in the growing season, forage may be of high nutrient content, but high water content in the forage may result in rapid passage through the rumen and incomplete nutrient extraction.

Indicators of high forage quality such as protein, energy, vitamins, and minerals decline as the growing season progresses (Figure 1). Conversely, indicators of low quality such as fiber and lignin increase as forage plants mature.

Typically, four nutrients are of primary concern to managers of animals on California's annual-dominated foothill and coastal rangelands: protein, energy, carotene (the precursor of vitamin A), and phosphorus. Additionally, certain minerals may be deficient or toxic at certain times or locations. Annual range forage may be deficient in copper. A high amount of molybdenum aggravates copper deficiency. Potassium and zinc may also be deficient in mature weathered forage. Other minerals such as selenium may be found in deficient or toxic levels in certain areas of the state.

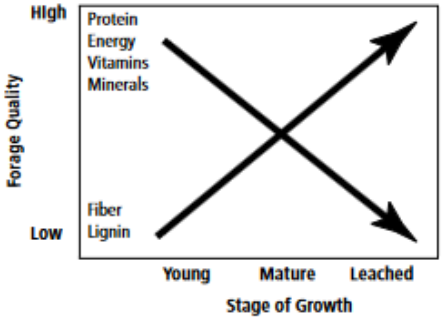


Figure 1.
Stages of growth and forage quality

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Available at http://anrcatalog.ucanr.edu/pdf/8022.pdf

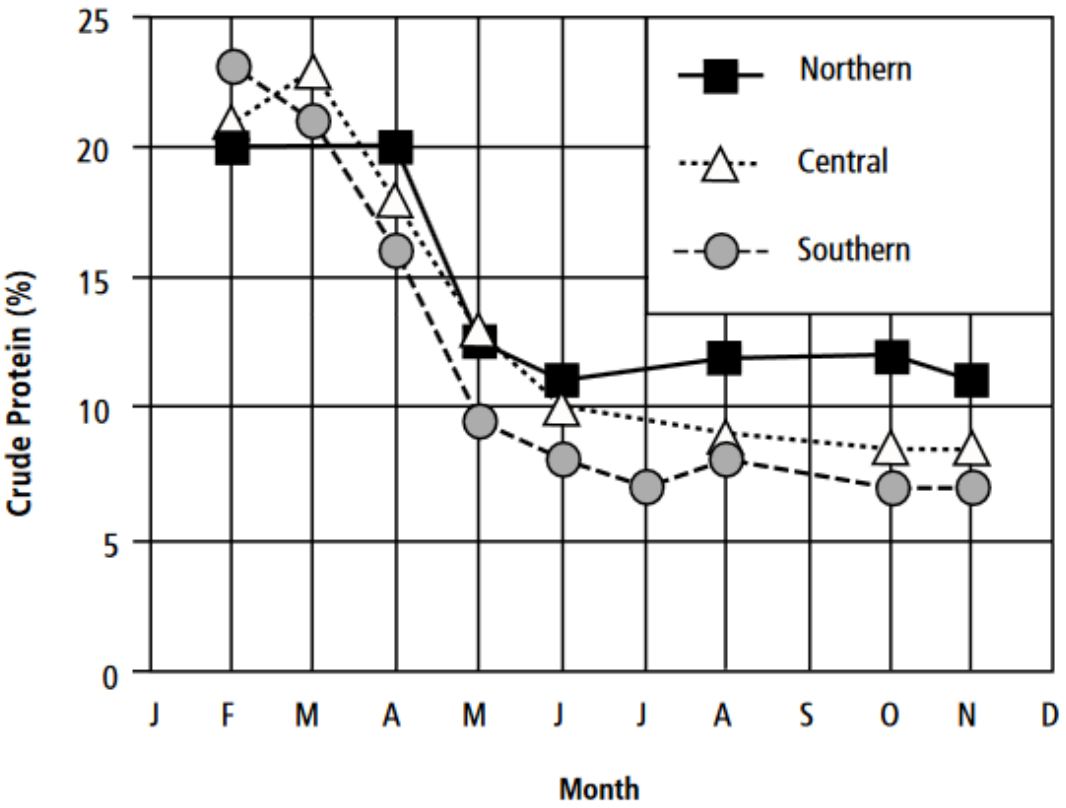


Figure 2.
Seasonal crude protein content of composite samples taken from 17 ranches along a north-south line from Red Bluff to Coalinga, California (Hart, Guilbert, and Goss 1932).

- The minimum dietary CP requirement for a 500 lb steer gaining 2.5 lb per day is about 12.5 percent CP, showing that growing animals require substantial supplementation during the dry season (NRC 1984).

- Fall-calving cows require only 7.5 percent CP in their diet during the last third of pregnancy in summer, while spring-calving cow (3 to 4 months postpartum) would require more than 9 percent. CP.

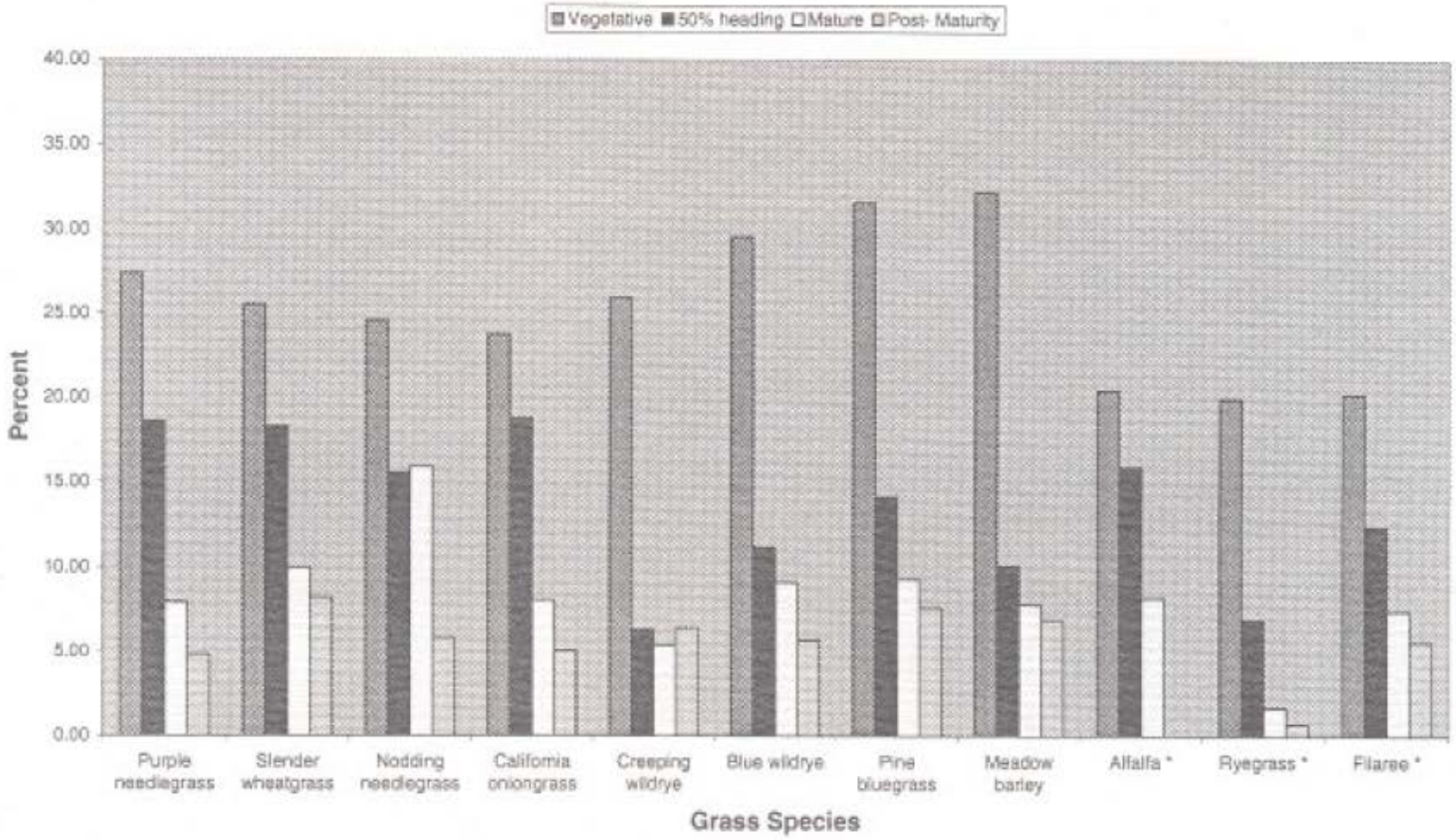
- Depending on the legume and forb content of the forage, supplementation may be required.

Table 1. Crude protein and crude fiber content of annual grasses, filaree, and bur clover at seven stages of maturity.

	Crude protein (%)			Crude fiber (%)		
Stage of maturity	**Annual grass**	**Filaree**	**Bur clover**	**Annual grass**	**Filaree**	**Bur clover**
Early vegetative	18	27	28	24	12	16
Late vegetative	15	25	27	25	14	17
Early flowering	15	22	26	26	16	19
Late flowering	10	16	22	29	21	23
Mature	6	10	19	33	26	26
Dry	5	7	18	34	28	28
Dry, leached	3	5	17	35	30	29

Source: Hart et al. 1932; Gordon and Sampson 1939

Crude protein for 8 native, perennial bunchgrasses and text values for 3 annual rangeland forages (*) at different sampling times



continued on page 5

Making a Difference for California

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Establishing and Managing Irrigated Pasture for Horses

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The establishment of irrigated pasture offers many advantages to the horse owner. Pastures bring together a high-quality forage resource and exercise space for the horse. However, irrigated pasture establishment requires careful planning. Preliminary considerations include the feasibility of irrigation, soil type in the proposed pasture, assurance that sufficient land is available to support your potential stocking needs, and the costs and availability of the equipment and materials you have to have if you mean to establish and maintain pasture. This publication is a guide to help you make horse pasture management decisions.

Pasture Establishment

Finding the right site

Thorough site evaluation is very important if you intend to establish a new irrigated pasture. Many sites are not practically suited to irrigated pasture production. Soil type and depth must be such that they do not limit root growth and that the soil has sufficient available water storage to make irrigation feasible and economical. A shallow soil with limited potential for water storage is a poor candidate for economical establishment of an irrigated pasture. You can find a good online tool to help you determine your site's soil type and associated information at the UC Davis California Soil Resource Lab website. To determine your soil type, click on the "online soil survey" tab at http://casoilresource.lawr.ucdavis.edu/drupal/.

The availability and cost of irrigation water are important factors in determining the economic prospects for establishing a pasture. Evapotransporation (ET) for a field is the combined amount of water lost to evaporation and used by the plants (transpiration). A reference evapotranspiration map (figure 1) has been developed by the California Department of Water Resources and the UC Davis Department of Land, Air, and Water Resources to help you determine a monthly average reference ET for your area. You can download an enlargeable PDF copy of the map at the CIMIS website (http://wwwcimis.water.ca.gov/cimis/cimiSatEtoZones.jsp), which also features a variety of other ET information.

Thank You