THE UNIVERSITY OF CALIFORNIA
SIERRA FOOTHILL RESEARCH AND EXTENSION CENTER

Beef & Range Field Day

April 28, 1994

Browns Valley, California

THE UNIVERSITY OF CALIFORNIA
SIERRA FOOTHILL RESEARCH AND EXTENSION CENTER

Beef & Range Field Day

COSPONSORED BY
UNIVERSITY OF CALIFORNIA COOPERATIVE EXTENSION
DEPARTMENT OF ANIMAL SCIENCE, U.C., DAVIS
DEPARTMENT OF AGRONOMY & RANGE SCIENCE, U.C., DAVIS

April 28, 1994

SIERRA FOOTHILL RESEARCH & EXTENSION CENTER
BEEF AND RANGE FIELD DAY
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Agenda

Registration: 9:00-9:30am -- $10.00 (Includes Proceedings, Lunch, Coffee & Donuts)

Morning Session: Cattle Management

Master of Ceremonies: Jim Oltjen, Animal Management Specialist, Dept. of Animal Science, U.C. Davis

9:30 Welcome - Mike Connor, Superintendent, Sierra Foothill R&E Center

9:45 Beef Industry Long Range Planning Task Force Report - Gordon Van Vleck

10:10 SPA - Analyze Your Cow-calf Production by Comparison with Standards - Jim Oltjen

10:30 Pinkeye Control Methods - Lisle George

10:55 Using Livestock to Manage Yellow Starthistle - Craig Thomsen

11:20 Cattle Handling Techniques - Roger Ingram

12:00 LUNCH BREAK: Barbecued beef tri-tips -- Prepared by the Yuba-Sutter Cowbelles & Chuck Wilson, County Director/Farm Advisor, Yuba/Sutter

1:00 Load "Buses" for afternoon tour

Afternoon : Range & Pasture Weed Control Tour

Master of Ceremonies: Doug McCreary, Natural Resource Specialist, Dept. of Forestry & Resources Mgmt., U.C. Berkeley

STOP #1: CLOVER DEMONSTRATION PLOT

1:15 SFREC Medusahead Management Activities - Mike Connor

1:30 Annual Clovers for Weed Control - Fred Thomas

STOP #2: HAWORTH EXPERIMENTAL PASTURE

2:00 Animal Health Update - E.B.A., Trichomoniasis, Selenium - Ben Norman

2:35 Update on USDA Starthistle Biological Control Research - Charles Turner

3:00 Irrigated Pasture Management for Weed Control - Bob Willoughby

3:20 Return to Headquarters and Adjourn

Participating Speakers

John (Mike) M. Connor, Superintendent, Sierra Foothill Research & Extension Center, University of California, Davis.

Lisle W. George, Associate Professor, School of Veterinary Medicine, Department of Medicine, University of California, Davis.

Roger Ingram, 4-H Youth Director & Livestock Advisor, University of California Cooperative Extension, Placer-Nevada Counties, Grass Valley.

Ben B. Norman, Veterinarian, School of Veterinary Medicine, Veterinary Medicine Extension, University of California, Davis.

James (Jim) W. Oltjen, Animal Management Specialist, Department of Animal Science, University of California, Davis.

Fred Thomas, Sales Representative, Lohse Mill, Inc., Artois.

Craig Thomsen, Staff Research Associate, Department of Agronomy & Range Science, University of California, Davis.

Charles E. Turner, Research Botanist, United States Department of Agriculture, Agricultural Research Service, Western Regional Research Center, Albany.

Gordon Van Vleck, Beef Industry Long Range Task Force and Former Director of California's State Resources Agency.

Bob L. Willoughby, Livestock Farm Advisor Emeritus, University of California Cooperative Extension, Butte County, Orville.

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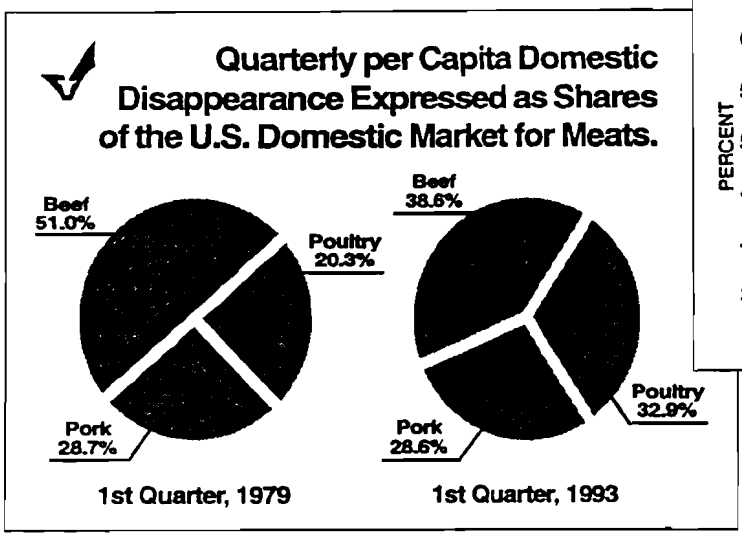
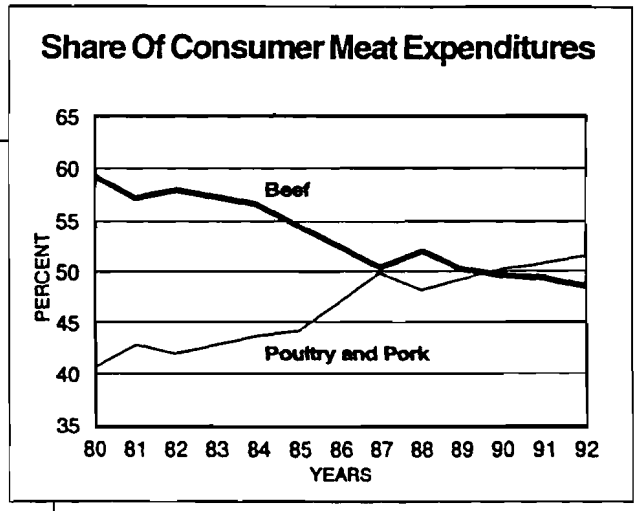
BEEF INDUSTRY LONG RANGE PLANNING TASK FORCE REPORT

Executive Summary

The U.S. beef industry has, for too long, been focused inwardly — production-driven, not consumer-driven. We have demonstrated neither the ability nor the inclination to respond adequately to consumer signals in the market place. Beef has lost market share to poultry and pork for a number of years. In 1992, poultry actually surpassed beef as the animal protein market share leader.

The bottom line is that the poultry industry has done a better job of meeting consumer demands with a product that is consistently high quality, high value, economically priced, effectively promoted and packaged for convenience. The pork industry, as well, is strengthening its ability to meet consumer needs and has declared it will be the meat of choice by the 21st century.





Source: USDA

Currently there are four major national organizations serving the U.S. beef industry — the Cattlemen's Beef Board, the Beef Industry Council of the Meat Board, the National Cattlemen's Association, and the U. S. Meat Export Federation.

Recognizing that the decade of the '90s is crucial for the beef industry, the elected producer leaders of these organizations saw the need for a unified effort in developing a plan to better position beef in the marketplace and improve organizational efficiency and effectiveness. With that in mind, they submitted an Authorization Request to the Cattlemen's Beef Board to fund an industry-wide Long Range Planning Task Force. The Task Force's charter was to develop a long range strategic plan for the beef industry that focused on domestic marketing, international marketing, issues management, public relations, efficient and effective use of resources, and industry governance.

THE PLANNING PROCESS

The 14-member Task Force was comprised of the presidents/chairmen of the four organizations and 10 at-large members from the industry, plus a project leader and a facilitator. The executive officers of the four national organizations served as advisors.

The challenge for the Task Force was to develop a long-range plan and, ultimately, a structure that would enable the beef industry to make more effective and efficient use of its human and financial resources, with the overall objective being to better meet consumer demands and expectations. An important first step in the process was an open, honest assessment of problems and opportunities currently facing the beef industry. The Task Force heard more than seventy (70) presentations and conducted interviews with key representatives of various sectors within the beef industry and competing industries.

Among the most significant findings from all these presentations were:

- Negative consumer perception of beef's quality and consistency.
- Negative consumer perceptions about the convenience and "customer-friendliness" of beef.
- Growth opportunity for U.S. beef in the international market.
- Social/political issues that disrupt the beef industry and create negative consumer attitudes.
- Challenges to beef production efficiency and ultimately product cost compared to costs of other meats.
- An "island mentality" among the various segments — seedstock, cow/calf, stocker, dairy beef, feeder, packer, distributor, retailer, and food service operator.
- Adversarial relationships among various segments, particularly the relationship between producers and packers, which prevents the industry from understanding and satisfying changing consumer needs.

LEVERAGE POINTS AND OUTCOMES

The Task Force identified eight leverage points (strategic points of impact) and outcomes (desired results) that will enable the beef industry to stop the decline and ultimately increase beef's market share. The leverage points were then discussed with various industry organizations.

From the feedback received, the Task Force identified the ***Quality and Consistency*** leverage point to be the most critical. The plan calls for reducing consumer dissatisfaction with beef quality (i.e., primarily toughness) by 50 percent by 1997. Other leverage points and desired key results include:

- **Domestic Marketing:** Stop the decline in market share by the year 1997.
- **International Marketing:** Increase U.S. beef's share of the international market from 9 percent to 18 percent by 1997.
- **Issues Management:** Identify and effectively manage potentially disruptive issues before they adversely affect consumers' purchases of beef.
- **Public Relations:** Present a strong, positive image of the beef industry and its products.
- **Production Efficiency:** Make beef more price-competitive by reducing production costs by 10 percent by 1997.
- **Producer/Packer Alliances:** Enhance product value and profit opportunities through better communication and cooperation with the packer segment.
- **Strategic Alliances:** Develop programs that focus on the consumer at every stage of the beef production cycle.

RECOMMENDED STRUCTURE

To ensure that the leverage points and desired results are attained as quickly, effectively, and efficiently as possible, the Task Force reviewed the current organizational structure and found that it presented a number of challenges to the overall success of the beef industry. Some of the major issues and challenges include:

- The beef industry doesn't have a single, unified plan with definable, measurable results.
- Multiple organizations, boards, and directors result in inefficient utilization of time and resources.
- The existence of multiple organizations creates confusion over which organization is the primary spokesman for the beef industry today.
- There is a lack of coordination and cooperation between state and national organizations.

The Task Force analyzed the current organizations and found that, as an industry, the structural criteria of focus, coordination, control, and cost effectiveness cannot be met. Without these structural criteria, we cannot achieve the outcomes of the plan. The Task Force, therefore, recommends a single consolidated national organization. The new organization should be structured in such a way that:

- People can focus on results rather than activities.
- Areas of responsibility are identified and delineated.
- The entire beef industry focuses on the same objectives.
- There is coordination and cooperation within the industry.
- The organization and its activities are managed cost-effectively.
- There is control and accountability to stakeholders for results.

The basis for the new national organization will be the stakeholders — members of state cattlemen's associations; state beef councils, the beef breed associations; Cattlemen's Beef Board; American National CattleWomen; packers, processors, and purveyors; and individual dues-paying cattlemen and women. These stakeholders or members will elect a Board of Directors. In short, board members will represent the stakeholders and reflect a "grass-roots" ownership of the new national organization.

The Task Force envisions an elected Executive Committee to be responsible for updating and maintaining the long range plan; for achieving the results outlined in the plan; for resource allocation; and for hiring/firing the Chief Executive Officer. The staff of the new organization will be drawn primarily from the existing talent pool currently within the industry.

The Task Force has developed a suggested timetable to make the transition from the current organizational structure to the new structure. It has also recommended an oversight committee to ensure that the transition from decentralized to centralized management goes smoothly.

A COMMITMENT TO SUCCESS

If the beef industry is to remain viable into the 21st Century, all segments of the industry must focus on consumer demands for quality, consistency, and convenience at a competitive and affordable price. To meet these demands, the industry must structure itself to provide **focus around specific objectives, a mechanism of control to assure results, coordination among all industry participants, and cost- effectiveness**. With this commitment to success, the goals that follow can be achieved by the end of this decade.

SPA - ANALYZE YOUR COW-CALF PRODUCTION BY COMPARISON WITH STANDARDS

Jim Oltjen, Extension Animal Science Specialist, UCD
Jim McGrann, Extension Agricultural Economist, Texas A&M University
Dan Kniffen, Manager of Technical Services, National Cattlemen's Association

Introduction

Since NCA approved the cow-calf Standardized Performances Analysis (SPA) Guidelines in 1992 over 300 cow-calf herds from 20 states have been analyzed. Efforts by early SPA users have showed the analysis provides useful production and financial performance information for any size herd or production region. Those who have used the information have made adjustments to their operations that have improved their incomes. The standardized methodologies have brought more reality to the numerous reference points or bench-mark values used in analysis and educational programs.

Extension specialists, veterinarians, and producers have found that cattlemen have the financial and cattle inventory information--developed for tax and borrowing purposes; that can be organized to complete the SPA analysis. Producers can use SPA's educational materials and experience for decision-making purposes; it is a good tool to help users strengthen their knowledge of both finance and cost-of-production analysis.

Producers, veterinarians and educators are also starting to realize that SPA helps expand their financial-analysis knowledge and experience. Accountants are playing a large role in financial-statement preparation. They can shorten the time required to complete the SPA analysis and provide better managerial information.

By implementing SPA, producers organize production data based on cattle inventories and then organize the balance sheet and income statements that normally require professional assistance. When using SPA for the first time it is extremely helpful to be able to ask a specialist questions. Most states now have someone experienced in SPA application.

Based on the positive experience of SPA development for use with the cow-calf enterprise, NCA, with help of producers initiated an effort to develop SPA for the stocker/feeder and seedstock enterprises. These new SPA programs will be available to the cattle industry in 1994. Similar to the commercial cow-calf SPA program, the new programs will incorporate calculations on production, land resources, marketing and financial measures. The programs focus on calculating cost of products for each enterprise.

All SPA programs have been developed with input from the many segments of the beef industry. Members from the National Integrated Resource Management Coordinating Committee which represent NCA producer volunteers, extension specialists, agricultural leaders and veterinarians were all key players in the development process. The

standardization of production (Table 1) and financial (Table 2) measurement for all enterprises and regions of the county will provide a producer with the information for an accurate comparison within his own enterprises as well as with other producers.

Stocker/Feeder SPA

The stocker/feeder SPA is flexible enough cover any enterprise between weaning and finishing periods. It focuses on grazing cattle and feeders in backgrounding or in confinement and finishing programs. The analysis summarizes either custom or farmer-feeder enterprises for the fiscal year. The analysis can also be used to evaluate preconditioning or background enterprises. Worksheets and software facilitate individual lot evaluation and combine lots on an annual basis for the integrated production and financial analysis for the fiscal year. This combination greatly facilitates the use of total-farm or ranch financial data generated for tax and financial-reporting purposes.

Production performance measures cover areas of production and feed efficiency for both receiving and grazing or feeding phases. SPA contains descriptive marketing information; however the primary focus is on cost of production and return on investments which matches the production to fiscal-year financial results. This provides a standardized analysis to make comparisons between enterprises and year-to-year performances. Producers often have individual-lot, partial-performance information but seldom put the stocker- or cattle-feeding enterprise annual analysis together. This makes it difficult to determine the unit cost of production and other SPA measures such as return on assets.

With increased emphasis on evaluation of retained ownership and different marketing alternatives, such as post-weaning preconditioning or backgrounding, the stocker/feeder SPA is a very useful analytical tool for cattlemen. The chosen performance measures are common industry measures. SPA helps introduce the use of a standardized calculation procedure and terminology, which greatly facilitates the analysis and interpretation of results.

Seedstock SPA

Seedstock SPA will provide an analytical tool to evaluate cow-calf, replacement-heifer and sale-bull enterprises. The seedstock cow calf enterprise production analysis follows the commercial cow-calf SPA, which focuses on reproduction, production and grazing. The SPA cow-calf analysis is used to track performance through the second- breeding and first calf-weaning periods. Replacement-heifer SPA--weaning to breeding age periods--focuses on the efficiency and cost of production of replacement heifers. The analysis can be used to evaluate performance by age group, production performance and cost and success rate in producing replacement cows. Sale-bull SPA measures the production efficiency and cost of producing sale bulls for different ages.

Multi-enterprise, financial-analysis software is being developed so individual enterprises can measure financial performance. This software utilizes total-farm or ranch-financial

statements that are developed using the Farm Financial Standards procedure. The seedstock beef-cattle SPA guidelines describe the methodology for allocating investment and expenses between enterprises.

To ensure that the SPA guidelines meet the needs of producers on a national scale, a lengthy process of drafting, revising, developing and testing the software has taken place. NCA committees of producers, veterinarians, and extension specialists are responsible for the review and testing process.

After final NCA-SPA committee approval the guidelines and software are approved by the National IRM Coordinating Committee and finally by NCA. Although SPA's development was lengthy and costly to develop, the process will generate an analytical tool for the stocker/feeder and seedstock producers to meet their integrated production and financial-performance needs as effectively as they have with the cow-calf SPA system.

Table 1. Standardized Performance Analysis Production Results for 184 Recent Analysis Across the U.S.

Pregnancy Rate		90.5 %
Calving Rate		87.4 %
Calf Death Loss		3.8 %
Calf Crop (Weaning Rate)		83.6 %
Weaning Weight (Males)	523 lb	
Weaning Weight (Heifers)	494 lb	
Pounds weaned/exposed female	426 lb	

Table 2. Standardized Performance Analysis Financial Results for 184 Recent Analysis Across the U.S.

	Financial	Economic
Total Cost per Cow	$ 392.40	$ 498.88
Cost per cwt	$ 79.42	$ 104.47
Net Income per Cow	$ 57.53	-$ 48.95
Investment per Cow	$ 2,146.00	$ 3,652.00
Return on Assets	6.72 %	3.69 %

BUD'S WAY

By Roger Ingram, Farm Advisor - Placer-Nevada Counties

Impacts caused by either reducing or increasing stress on animals were a constant theme as I spent 7 weeks on a study leave at a Canadian feedlot in late Fall, 1993. These impacts affected animal performance, health, and death loss in a positive or negative way. The purpose of my study leave was to gain a better understanding of low stress livestock handling techniques as developed, demonstrated, and taught by Bud Williams. He is the world's leading expert on livestock handling. These techniques are being utilized on a daily basis at Vee Tee Feeders, a 7500 head capacity feedlot located near the Alberta-Saskatchewan border town of Lloydminster.

Bud has devoted the last 35 years of his life to working and observing animals. He was so dedicated that he would offer to work for free on ranches just so he could have the opportunity to work cattle the way he wanted. It was tough being a pioneer, but Bud persisted and began to develop a philosophy and techniques that were radically different from "traditional" approaches to livestock handling.

Make Vrs. Let

These differences come down to the principles of make versus let. We have worked animals in the past by MAKING them do what we want. Fear and force were used to dominate animals. Given the harsh nature of life and livestock 150 years ago, this philosophy was warranted and worked. Our persistence in maintaining this philosophy today is costing money in the form of lost performance, higher health costs, and reduced worker productivity.

Using techniques developed by Bud, you LET the animal move. Your position in relation to the animal will determine movement, direction, and speed. It is a win-win situation. The animal thinks it is moving where it wants, but your positioning allows you to get what you want. The result is animals stay calm and are easy to handle. No whips, hot shots, prods, yelling, or hands waving are needed to get results.

Predator Vrs. Friend

We have tended to study animal behavior from a predator, fear, and attack standpoint. This has tended to lead us in the direction of our establishing dominance over the herd. It also leads you down the path of making them do something. Your goal should be to have the animal view you as a friend. They should not be afraid of you. Use finesse in working animals. Do not just bulldoze through. After all, they are stronger, faster, quicker, and there are usually more of them.

Stress

Why change? After all, most people eventually get the animals to go where they want. The answer is STRESS. When you make an animal do something, you increase stress on the animal. Stress has been defined in a number of ways. Webster defines it as a constraining force or influence such as a

physical, chemical, or emotional factor that carries bodily or mental tension and may be a factor in disease causation. Making animals do something causes stress. Stress is costing livestock producers money through decreased animal performance, increased health costs, and a greater incidence of bruised carcasses. According to the National Beef Quality Audit, the cattle industry loses $22 million in bruised carcasses. An additional $500 million is lost due to shipping fever. Improper livestock handling is the leading cause of these losses.

Stress on animals can happen quickly. If you do not do anything about it, the effect will last for days. Using Bud's techniques, you can reverse the negative impacts of stress. I'll give you a personal example to illustrate.

The Red Heifer

In trying to pull a single animal out of a pen, you need to go slow. Don't blunder about chasing them. Then they know you are trying to get them. You should quietly drive them toward the gate, acting like it is no big deal. Let the animal set the pace. Then when they are near the gate and stopped, you can go open the gate, walk towards the animal, and take it out of the pen. This should all be done quietly with minimal disturbance to the animal or others in the pen.

One day an employee and myself had to pull a red heifer out of pen to treat. It wasn't that sick, but Bud felt it needed to be treated so it would not get seriously ill. It took both of us 3 times to get the heifer out of that pen. She would get up by the gate, and then break out to the back of the pen. In doing this, we stressed her greatly. We had moved too quickly and were trying to force something too happen. We needed to just relax and take our time.

Because of the stress we put on the heifer, the treatment we gave became irrelevant since the drugs were not going to have any effect in her present state. The next day, the heifer was really sick and needed to be pulled again. Bud had to spend 20 minutes before he could get the heifer out of the pen. In addition, we had gotten the heifer to where it would not go up to the feed bunk to eat. This is a major problem with any animal, especially a sick one. Bud spent over an hour with the heifer getting it up to the feed bunk on this day.

Working with the heifer twice a day, Bud was able to get the heifer to where she would go up to eat on her own in a week. She was feeling better and was going to make it. This story illustrates both the negative and positive impacts you can have with your actions. Bud's efforts in working with the heifer saved her life. Our efforts almost killed her. We pulled the heifer in 10 minutes.

A Different Way of Thinking

A livestock person's aim should be to support and promote animal health, not cure disease. Unfortunately, health in ourselves and animals is often taken for granted until something goes wrong. This leads us down the path of being more interested in the disease rather than health. The habit of flying to the syringe has become on of the biggest disease problems on the farm.

Remember that all animals have a general capacity to resist infection or they would not be alive.

Antibiotics are most effective when they are used as little as possible. When an antibiotic is used frequently or indiscriminately, it is not uncommon for drug resistance to occur. This is not to imply that drugs are bad. They can be highly effective when used in a judicious manner at the first sign of disease. It is important to understand and accept that our handling of animals can go a long ways to enhancing or reducing the animal's ability to resist infection.

Richard Davies, co-owner of Vee Tee Feeders, has adopted the use of Bud's methods at the 7500 head feedlot. He also coordinates schools that Bud teaches at the feedlot. He states the following, "Despite the increase in available knowledge and technology, we are losing ground in the area of disease. We started out with only a few diseases, now we have more. Despite having way more vaccines and antibiotics, we still have a problem.

Bud's methods change the way cattle are handled both mentally and physically. Typical handling practices provide a fertile ground for organisms to flourish. The industry pays lip service to physical stress. The real problem is mental stress. If we keep stress down and the calf healthy, the bugs do not have a chance. If we can alleviate mental stress, cattle will do great.

People are frustrated and tired of cattle getting sick. There is total chaos all the time and everybody is mad. One wreck leads to another. You need to show compassion, not whooping and hollering."

What Do You Need To Know?

The two most important things you need in working animals are: GOOD ATTITUDE and BELIEF in what you are doing. Your attitude is THE most important thing. You need to feel happy and relaxed as you work cattle. The animals will pick up on a negative attitude.

General Characteristics

Flight Zone

Every animals has a flight zone. Theoretically, you step into the flight zone to get movement and step out to stop movement. The flight zone is not static. It expands and contracts as the animal is moving. In addition, the flight zone is not necessarily a circle. The sides will tend to flatten out which allows you to get closer to the animal (Figure 1).

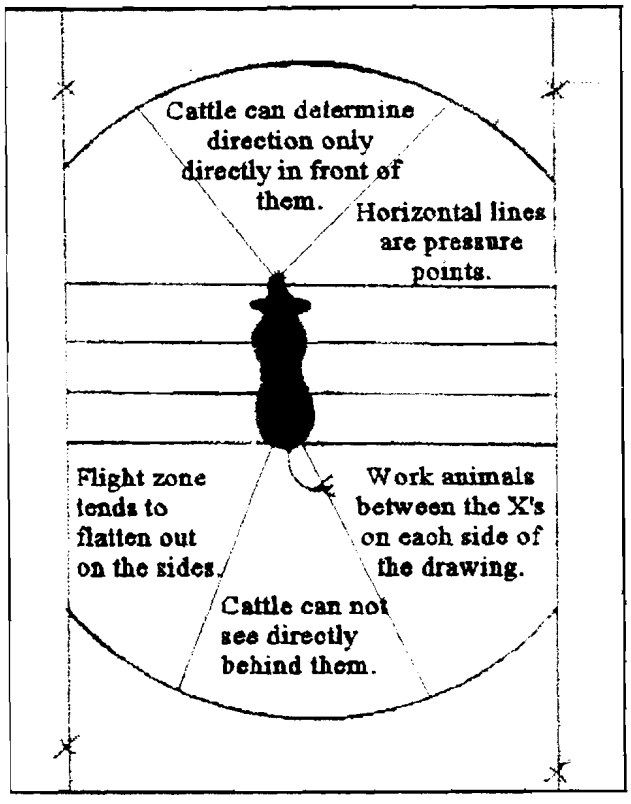


Figure 1

Sight Characteristics

Cattle can see you and tell how far away you are when looking directly ahead. Cattle can also see you from the side, but they can not tell how far away you are. They can not see directly behind. As a result, you should not pressure directly behind an animal for any lengthy period. This does not mean you can not pressure from behing. You just can not stay in that area where they can not see you for any length of time. If an animal turns to look at you, you are either too far away or too far back.

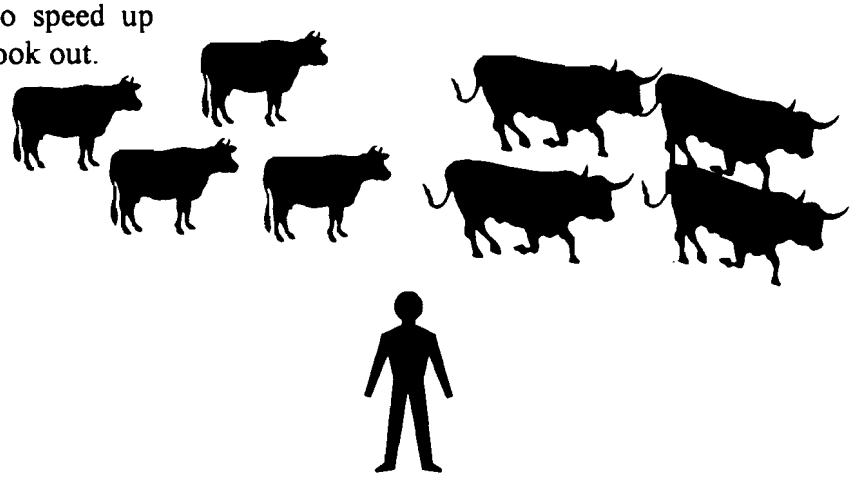
Pressure Points

You can pressure and animal at its head, shoulders, side, and hips (Horizontal lines in Figure 1). The angle and direction of approach will determine what the animal will do. Since your tendancy will be to pressure too far behind the animal, you should aim more towards the front, than the rear. Keep in mind that with moving animals, you will have to lead your approach past the head in order to pressure to the front by the time you reach the animal. Otherwise, if you just aim at the head, you will actually be pressuring the hip by the time you get to the animal.

Movement and Direction

It is most important to keep movement and direction. There are two things which will stop movement -

1. Going up the side in the flight zone. This causes part of the herd to slow down or stop and part to speed up and hook out.



2. Getting directly behind to move the animal. This will cause them to turn and look at you because they want to see you.

Animals will tell you where you need to be. If you get out of position, they will let you know. In order to tell this, the first step is to be looking at the animals. Your tendancy will be to go too far in your movements. Time and experience will increase your ability to "read" the animals. Working back and forth with animals will get you movement and direction. When going back and forth, you need to be close enough to get movement and you must walk in straight lines.

You are always seeking to get a nice, smooth flow with your animals. You should go with movement until it stops or cattle go in the direction you want. When animals are not moving, you have to create a back, side, and front.

Important Points To Remember

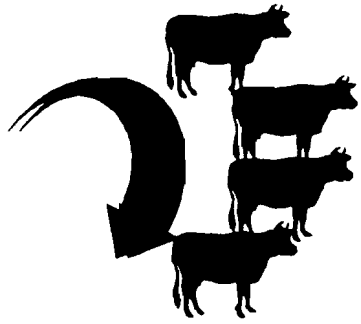
1. Slow Down - This is the number one error that I made time and time again. You need to learn to move quicker and slower, rather than later and faster. Moving faster gets the animals nervous.

2. Relax - This is related to slowing down. If you are uptight, your movements will tend to be herky jerky instead of smooth and easy. The cattle pick up on this and start to get nervous. I have first hand experience doing this. You end up getting cattle so nervous that you are almost beaten before you start.

3. Watch your cattle - They actually tell you what you need to do. They will put you in the right position. This means keeping your head up instead of looking at the ground. Bud wanted to get a picture of the ground and tape it to the bill of my cap so I would not have to look at the ground anymore.

4. Go back and forth - Going back and forth is critical. It allows you to get in the right position. Sometimes, the back and forth is several steps in one direction, and then going back in the other direction for several steps. Other times, the back and forth is just a shifting of your weight from one side to another. Again, the cattle tell you what you have to do.

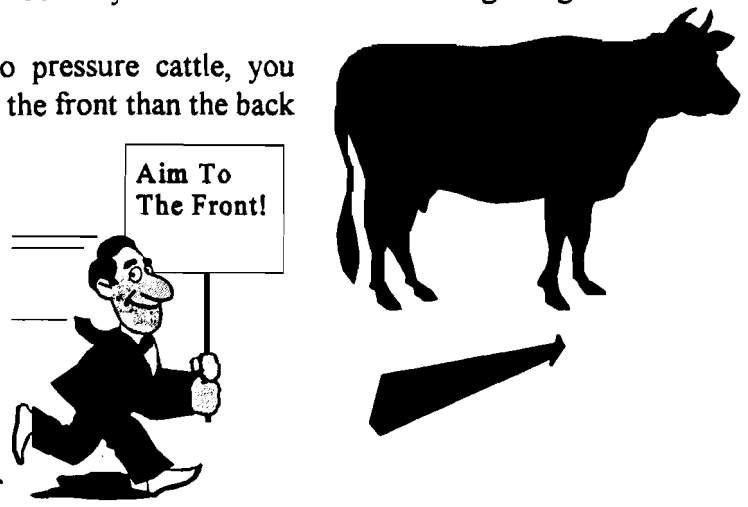
5. Walk in straight lines - This sounds simple, but can be quite difficult. Most people pick up on going back and forth fairly easily. Unfortunately, they do not do it in straight lines. Instead, you tend to arc in towards the cattle because your instinct is saying to shove in on them. When you shove in, you create dips and bulges in your herd which creates a whole set of difficult problems.



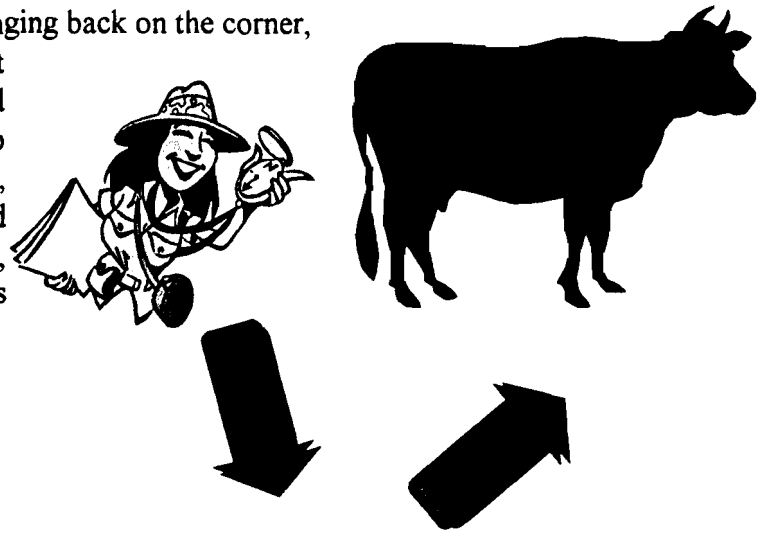
I used to practice going back and forth in a straight line at night in my apartment. I walked perfectly straight lines. When you have live moving animals, all those straight lines tend to go out the window. The dynamic of movement can really throw you off. The other thing is that you can not stop the whole herd and say time out to allow yourself to get back to walking straight lines. You have to recognize your mistakes and correct them on the fly.

6. Get closer - One of my biggest problems was being too far away from the cattle. You can be going back and forth. You can be walking straight lines. If you are not close enough, the cattle will stand there and look at you. You must be close enough to get movement.

7. When deciding where to pressure cattle, you should aim more towards the front than the back of the animal. Your instinct is to pressure too far back, so this can help overcome that tendancy.

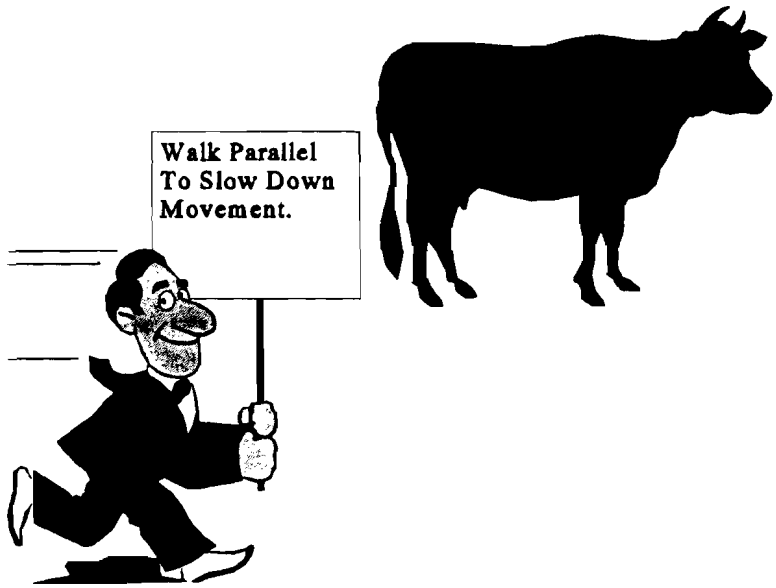


8. If you have a herd of animals and you have one hanging back on the corner, it may be that the movement of the herd will go ahead and draw that animal. If you do decide to move that animal, then go do it. You should walk past that animal, turn, and then pressure towards its head.

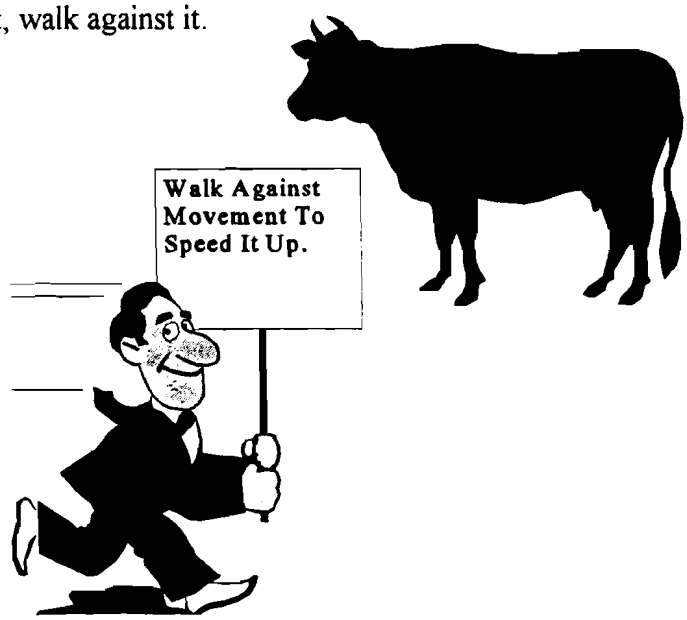


This sounds simple, but the tendancy is to walk towards that animal and then move away from it once it starts to move. When you walk away, then the animal stops again. Then you go back again. If you are not careful, you may end up doing this 5-6 times. While you are messing about with the one animal, you fail to keep motion going in the rest of the herd. The herd starts to slow down or stop, and then you have a much bigger problem getting that motion going than you did when you first went to get the one.

9. To slow down movement, walk parallel with it. This is especially useful if you are trying to settle a pen of calves that has a lot of movement.



10. To speed up movement, walk against it.



None of the above things are difficult. In fact, you could probably explain them to a 10 year old and it would be understandable. I can not stress too much the power of your instincts to take you away from what you should be doing. If you are reading this thinking that you are different, it would never happen to me - think again. You are a prime candidate to have it happen to you.

How do you overcome it - Persistance, staying alert, practice, and a willingness to take criticism and learn from it. This is something you have to learn and be accountable for your actions. The animals hold you accountable. After all, they do not care whether you tall or short, fat or skinny, beautiful or plain, educated or illeterate. They just see you and want to know what you are going to do to them. This means you can have a tremendous effect on the animals without your even realizing what you are doing.

Conclusion

These methods work. They will save you time and money. They will increase productivity and profitability at no extra cost to you. You just have to be willing to invest time and endure some frustration as you fight your instincts. The field of livestock handling is a new frontier that is just now starting to open up. The impacts of doing things properly are as large as veterinary medicine. They can be done. Next time you go to work cattle, try some of the things mentioned in this paper. You only start by taking that first step. Good luck!

ANNUAL CLOVERS FOR WEED CONTROL

Fred Thomas
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Introduction

The planting and managing of annual clovers as a tool in the control of rangeland weeds has been recognized and recommended by the University of California for over 40 years. Their 1965 publication *Improvement of Medusahead-Infested Rangeland* states that the "best results in controlling medusahead by plant competition have been obtained by the establishment of annual legumes." Recent use of annual legumes as weed smothering cover crops in both annual and perennial cropping systems in California and other parts of the United States has caused many researchers to 'rediscover' this sustainable method of weed control.

In the Fall of 1992 an annual legume plot was established as a varietal demonstration of the various clovers that are normally planted on rangeland. This unreplicated plot was a side by side comparison of newer versus older subterranean clovers to observe maturity, height, and persistence. The observations of this plot during the 1992-1993 rainfall season reinforced the long known fact that besides being excellent forage, annual legumes can be effective competitors with unwanted weeds.

Methods

The Sierra Field Station Clover Demonstration was seeded October 17, 1992. The clovers were broadcast onto a disked seedbed at the high rate of 30 lb/acre. All the legumes were pre inoculated with Rhizo-kote inoculum for their specific rhizobium, except 'Hubam' White Blossom Sweet Clover that was inoculated with Nitragin Type A rhizobium. The plot was fertilized with 75 lb of 16-20-0-15 and then ring rolled to firm the seed. The first significant germinating rain occurred October 29, 1992. All the plots were then mowed to a height of 2 inches on March 11, 1993, to simulate heavy grazing.

Varieties Tested: Description, Characteristics, and Purpose of Planting

Clare Subterranean Clover. An older variety that has a relative maturity of 130 days to flowering and a hard-seededness of 3 (based on 10 being highest and 1 being lowest). Clare has traditionally been the subclover of choice when the soil pH is higher than 7.5. It is easily identified in the field by the leaf's chocolate-red center surrounded by the white watermark. Clare was planted in this trial to observe the performance on the acid soils at Sierra Field Station.

Karridale Subterranean Clover. A newer variety that has a relative maturity of 140 days to flowering and a hard-seededness of 4. Karridale was released as the replacement for the full season variety Mt. Barker. Karridale is particularly dense in its growth habit producing more forage than Mt. Barker and is more persistent under drought conditions because of its hardseededness. Karridale was planted in this trial to observe its performance side by side with Mt. Barker.

Mt. Barker Subterranean Clover. Probably the oldest commercial variety planted in California with stands in Humboldt County dating back to the 1940s. Mt. Barker has a relative maturity to flowering of 140 days and a hardseedness of 1. It has slow winter growth but produces good forage in the Spring. While Mt. Barker is still commonly sold, newer varieties have superior forage and growth characteristics.

Dixie Crimson Clover. Crimson Clover has a relative maturity of 105 days to flowering and a hardseedness of 3. Upright growth with large hairy leaves, it is a major forage legume in the Southeastern United States and is frequently used in cover cropping situations. Use on California rangelands has not been encouraged in the past because grazing by animals will remove all the seed heads and prevent reseeding. Widely adapted from clay to sandy soils it is very productive when sufficient water is available. It has consistently been the fastest winter growing legume in both cover crop and range plots. It was planted in this trial primarily for color but has shown promise as a good weed control plant.

Santiago Burr Medic. This is the newest of the Australian introduced, spineless 'burr clovers.' Santiago has a relative maturity of 100 days to flowering and a hardseededness of 10. As with most burr medics, Santiago prefers heavy soil and a pH of 7.0 or higher. It was planted in this plot to evaluate its performance on the red, acid soils of the Field Station.

Koala Subterranean Clover. A new variety that has a relative maturity of 135 days to flowering and a hard-seededness of 5. Koala was originally developed in Germany as a green manure legume. Like Clare, which it can replace, Koala performs very well on soils with a pH of 7.5 and higher. It is large leafed and upright which gives it a showy appearance. During the 1980 drought years, rangeland plots conducted by Monte Bell et al in Glenn and Colusa County, Koala (also called Nuba) was impressive in its growth and persistence. Likewise, cover crop plots in grapes and almonds have shown Koala to be very weed suppressive. It is planted in this plot to compare it to Clare on acid soils.

Junee Subterranean Clover. A new variety that has a relative maturity of 125 days to flowering and hard-seededness of 5. Junee is a mid-season subclover and was developed as a replacement for the old variety Woogenellup. Superior in both forage yield and persistence, Junee is the preferred variety for rangeland plantings. Currently strong demand for this variety in Australia prevents adequate supplies from reaching the California market. Junee was planted in this plot to evaluate its performance at Sierra Field Station.

Hykon Rose Clover. The earliest commercial rose clover variety it has a relative maturity of 95 days to flowering and a hard-seededness of 10. Usually two weeks earlier than Wilton Rose Clover, Hykon is very drought tolerant and will usually set seed on the poorest of soils and rainfall sites in California. Conversely, it will also continue to produce forage and

flowers on into May during wet Springs. It is upright and branching in growth and represents excellent dry feed for livestock producers during Summer and Fall before green feed is available.

Dalkeith Subterranean Clover. A new early season subclover it has a relative maturity of 95 days and a hard-seededness of 9. The other early season subclovers have had the following problems in California; Geraldton has high estrogen, Nungarin matures very early and produces less forage, Northam has failed to persist in many plantings. Dalkeith with a slightly longer maturity and equal hard-seededness is looked to as a replacement for the other early varieties. In this plot it is being evaluated against Nungarin.

Nungarin Subterranean Clover. The earliest subclover, Nungarin has a relative maturity of 80 days and a hard-seededness of 10. Nungarin is low in estrogen and is well adapted to the harsher environments of Central and Southern California. It will persist on acid sites in a 7 to 9 inch average rainfall zone. Unfortunately, in wet years with abundant rain, it will still flower, seed and die early. At Sierra Field Station we are comparing it to Dalkeith.

Hubam White Blossom Sweet Clover. An annual sweet clover that is grown in Texas, Hubam would have a relative maturity of 150 days and a hard-seededness of 10. It is tall and stemmy and will grow on clay soils with a pH greater than 7.0. The first season the crop grew well until it was mowed in March, and then regrowth was poor. Even though it was not in a favorable rainfall or soil pH environment, it was included in this trial to see if there was any potential for it as a California rangeland legume.

Secondary Observations on Weed Control

The initial purpose of this trial was to observe varietal forage yields and stand persistence of the various clovers. Three important factors allowed us to also observe the genetic potential of these plants to act as weed control agents. First, there was a good rainfall year with an early germination, a wet (warm) winter and good spring rain. Second, the seeding rate was higher than is normal and the plot was well fertilized with the essential nutrients; nitrogen, phosphorus, and sulfur. Third, the legumes were clipped (grazed) in early March hurting the photosynthetic ability of the weeds and invigorating the prostrate legumes to grow and smother the weeds.

The site of this trial had been in eucalyptus and parts of it had fewer weeds than other parts. Since weed control was not our initial goal, transects of existing populations were not considered necessary before planting. Despite this scientific lapse, the following observations were made during the Spring and Summer of 1993. The level of weed suppression was graded on a scale of 1 to 10, with 1 being poor weed suppression and 10 being excellent weed suppression.

Variety	Score	Reason
Clare Subclover	5	Good Winter growth, but allows late weeds.
Karridale Subclover	7	Forms a very dense stand after mowing (grazing).
Mt. Barker Subclover	2	Slow Winter growth allows weeds to establish.
Crimson Clover	10	Rapid Winter growth and height smothers weeds.
Santiago Burr Medic	2	Poorly adapted species to red, acid soils.
Koala Subclover	9	Forms a very dense stand after mowing (grazing).
Junee Subclover	7	Good Winter growth, but allows late weeds.
Hykon Rose Clover	5	Good Winter vigor, but upright habit allows late weeds.
Dalkeith Subclover	4	Good early suppression, but stops growing in April.
Nungarin Subclover	2	Sparse growth habit does not smother weeds.
Hubam Sweet Clover	1	Poorly adapted species with an upright growth habit.

Anecdotal Rangeland Seeding Conversions

Two different rangeland seeding experiences are worth repeating where legumes were used to convert weed infested rangeland to good pasture.

The first was a 200 acre field 20 miles west of Orland in Glenn County. It was a heavy soil site that had been farmed to barley and then infested with star thistle. In 1981 the site was seeded to a 25 lb/acre mix of subclover and fertilized with 0-25-0-10. It was a good rainfall year and the clover even without grazing was solid and matted. The previous year the ranch had over 70 cases of pinkeye due to the star thistle, the year after the seeding there was no star thistle and no pinkeye.

Another rangeland seeding in 1982 in Penn Valley, Nevada County, involved 50 acres of rangeland that was a loamy soil. At the time of seeding the pasture was 95 % infested with medusahead and the owner was wishing to improve the forage condition. Again the owner planted 22 lb/acre and fertilized with 0-25-0-10. The pasture grew very well since it was a good rainfall year. The clover grew into the old medusahead straw and the cattle removed the old litter in an attempt to eat the clover. The combination of fertilization and heavy grazing allowed the clover to form a good mat that prevented new medusahead from establishing well. At the end of the first year the medusahead had been reduced to 10 or 15 % of the pasture.

Management Scenarios to Convert Star Thistle Back to Productive Rangeland

1. Large Flats Which can be Disked.
    - A. In late April as the new crop of star thistle flowers, disk it and the old skeletons down to make a Fall seed bed and prevent a new crop of seed.
    - B. Finish working the seedbed in the Fall.
    - C. Plant crimson clover at 25 lb/acre and fertilize with phosphorous and sulfur.
    - D. Lightly graze in February to cause branching if possible.
    - E. Let it grow tall in Spring smothering the weeds.
    - F. Cut for hay if the star thistle gets through the dry clover.

G. Direct graze in the Summer.

2. Large Flats and Rolling Hills Which can be Mowed, Disked or Sprayed.
   A. In late April as the new crop of star thistle flowers, disk or mow.
   B. Continue to mow in the Summer to prevent seed development.
   C. Plant a mixture of subterranean and rose clover at 25 lb/acre.
   D. Fertilize with phosphorous and sulfur.
   E. Spray an approved broadleaf herbicide to kill the star thistle, realizing that subterranean clover and to a lesser degree rose clover is tolerant to 2,4-D type herbicides.
   F. After the approved waiting period of 14 to 30 days return to normal grazing.
   G. If star thistle is still a problem the second year, repeat the herbicide program.

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IRRIGATED PASTURE MANAGEMENT FOR WEED CONTROL

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Weed control in irrigated pastures can be accomplished through a combination of cultural and management practices. Practices that maximize forage yields by sustaining high forage crop vigor will simultaneously reduce weed establishment. Specific weed-reducing practices are important during land preparation, at seeding time, during seedling establishment, and periodically after establishment.

Existing weeds, particularly difficult perennials, on a field planned for pasture seeding, should be controlled prior to surface grading. Bermudagrass, Johnsongrass, and Canadian thistle, are prime examples. Underground rhizomes of these species are readily spread by leveling and cultivation operations. Curly dock, Rumex Crispus, can also be a problem, particularly on heavy, moisture-holding soils.

Proper land leveling is important to prevent high dry spots and poorly drained low areas. Both conditions reduce desirable plant populations thereby reducing competition for the weeds. Poorly drained areas at the low or drain end of pastures are common problem areas.

Annual weed populations can be reduced after land leveling and prior to seeding by irrigating the field to germinate weeds and then follow with cultivation. Two cycles of irrigation and cultivation will reduce weed pressure and develop a good seed bed. Raising a crop of grain or hay like sudangrass, oats, etc. the summer preceding pasture seeding is an alternative to weed germination and cultivation.

Appropriate fertilization with nitrogen, phosphorus, or sulfur, or blends of these, help retain a productive grass-legume balance and keeps the pasture in a vigorous condition. Livestock stocking rates must be adjusted with the seasons to avoid over-grazing and soil compaction.

Water management is the most important pasture management practice for maximum production and weed control. The two most important consideration when irrigating are: 1) Do not have the animal in the field when the water is on. Wait at least two days after the water is off before putting the animals back on the field. 2) Apply adequate water but do not leave the water on more than 12 hours at any one setting.

Mowing permanent pastures at least annually promotes a more even balance of forage species by increasing light for the lower legume canopy. It additionally improves more even utilization by stock by removing mature, less palatable lower quality growth. Clipping is an

additional pasture management aid in removing the upright flower stalks of thistles and other tall-statured weeds thereby reducing seed dispersal. Clipping is usually not an effective measure to kill weeds. Some problem weed species grow below usual mowing heights and are benefitted by the increased light made available by clipping (or grazing). An example is bermudagrass.

Very intensive grazing for a few days practiced on a rotational basis, called mob stocking, or short duration, high intensity grazing, is a management system widely adopted in New Zealand and other countries. The forage is intensively utilized for a few days (commonly 1-4 days) but is allowed to recover for 30 or more days before grazing is repeated. Proponents of mob stocking indicate that more uniform and complete forage and weed utilization occurs.

If weeds do appear and persist, a very direct control measure should be adopted and at the same time pasture management deficiencies should be identified and corrected. The hoe and shovel are time honored weed control tools for early, small infestations and should not be overlooked. Alternatively, registered herbicides such as 2, 4-D for broad-leaved weeds or glyphosate for grass weeds may be selected to spot out early and small infestations to halt their spread. Read and follow label recommendations.

If, after several years of well intentioned management, weeds become dominant and forage species have become sparse and virtually noncompetitive, the only practical recourse is to plow, control difficult perennial weed, and reseed.

BIOLOGICAL CONTROL OF YELLOW STARTHISTLE: 1994 UPDATE

(Presented at the 1994 California Weed Science Society Conference)

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Yellow starthistle (*Centaurea solstitialis*, Asteraceae) is a spiny annual that is highly invasive on grasslands and other environments in California and other western states. The spiny flower/seedheads deter grazing by livestock and are a nuisance to people. The plant is poisonous to horses. Yellow starthistle is native to the Mediterranean Basin and southern Eurasia, where it is held in check by numerous natural enemies - 42 species of insect natural enemies are known from Greece and Italy alone (Clement, 1990). Our biological control program for yellow starthistle is being conducted in cooperation with our (USDA-ARS) European Biological Control Laboratory, and within California in cooperation with the California Department of Food & Agriculture (CDFA), County Departments of Agriculture, and the University of California (UC). Our research has thus far focused on five flower/seedhead insects from Greece (Turner et al., 1994). The larvae of all five species feed internally within yellow starthistle heads, and their impact is to reduce seed production, the only means of reproduction and spread by the weed. These insects are briefly discussed below in the order of their first introduction into the United States.

Biocontrol Insects

Urophora sirunaseva (Diptera: Tephritidae) was first introduced in 1984, and as of 1993 establishment was confirmed in CA, OR, and WA (Turner et al., 1994). The fly has two generations per year. Oviposition occurs on intermediate, closed head buds (Turner, 1994). Woody galls are formed around developing larvae, one larva per gall. Within a galled head, the galls essentially replace seeds, and the woody galls may also act as a resource sink on the entire plant such that the overall number of heads produced by a plant is reduced by the galled heads. This fly is gregarious in the sense that multiple gall formation in an infested head is typical, and most of the larvae in multiple-galled heads successfully complete development into adult flies. We have recorded up to 12 galls in a galled head in the field in California (Turner et al., 1994). Through 1993, releases of the fly had been made in 31 counties in California.

Bangasternus orientalis (Coleoptera: Curculionidae) was first introduced in 1985, and as of 1993 establishment was confirmed in CA, ID, OR, and WA. This weevil has one generation per year, and oviposition occurs preferentially on the scale leaves subtending early, closed head buds. Larvae bore into the head where they feed primarily on receptacle tissue. Impact data from two study sites indicate that a single *B. orientalis* larva in a head destroys only between 50% and 60% of the seeds (Maddox et al., 1991). This weevil had been released in 47 California counties through 1993.

Chaetorellia australis (Diptera: Tephritidae) was first introduced in 1988, and establishment was confirmed in OR and WA as of 1993. The fly has two to three generations per year. Eggs are inserted beneath the involucral bracts of late, closed head buds (Maddox et al., 1990). Larvae feed as they tunnel through and destroy most of the developing seeds in a head. Through 1993, this fly had been released in five counties in California, though establishment has not yet been confirmed here. This fly may require the presence of a second host (*Centaurea cyanus*, a minor, naturalized weed) in the same general area infested by yellow starthistle. Adult emergence of all or most of the overwintering generation flies appears to occur before most yellow starthistle heads are available for oviposition. *Centaurea cyanus* flowers earlier than yellow starthistle and thus *C. cyanus* heads are available for oviposition by the early-emerging flies from the overwintering generation. If the general presence of *C. cyanus* is necessary for a thriving population of the fly, then this fly does not hold much potential for California, where *C. cyanus* is not very common. We will, however, continue our introduction attempts with Greek-imported flies at least through 1994.

Eustenopus villosus (Coleoptera: Curculionidae) was first introduced in 1990, and establishment was confirmed through 1993 in CA, ID, OR, and WA. This weevil has one generation per year. Eggs are inserted inside late, closed head buds. The larvae feed on receptacle tissue and are capable of destroying most to all of the potential seeds in a head. Unlike the other insects, adult feeding by *E. villosus* also has a major impact on the weed. Adults feed on early, closed head buds, in the process completely destroying them (Fornasari et al., 1991). Our experience thus far with lab and field populations indicates that adult feeding can destroy a substantial number of yellow starthistle head buds. Thus both adult and larval feeding reduce seed production by the weed. Through 1993, *E. villosus* had been released in 14 California counties.

Larinus curtus (Coleoptera: Curculionidae) was first introduced in 1992, and establishment has been confirmed in CA, OR, and WA through 1993. The weevil has one generation per year. Eggs are laid among the flowers of heads with open flowers, and larvae feed on developing seeds (Fornasari and Turner, 1994). The weevil had been released in three California counties through 1993, and additional releases of Greek-imported weevils are planned for 1994.

From introductions made by USDA-ARS beginning in the mid-1980s, five biocontrol insects from Greece for yellow starthistle are currently established in the United States, and four of these are established in California. Among these four and five species, the entire course of head development in yellow starthistle is attacked/oviposited upon: *B. orientalis* on the early, closed buds, *U. sirunaseva* on the intermediate, closed buds, *E. villosus* and *C. australis* on the late, closed buds, and *L. curtus* on the flowering heads. As of 1994, three of these insects are available in the redistribution/implementation program underway within California. Their availability from most available to least available is as follows: *B. orientalis* > *U. sirunaseva* > *E. villosus*. This redistribution program is being coordinated by CDFA in cooperation with County Departments of Agriculture. Land owners and managers wanting these biocontrol insects for yellow starthistle should contact their County Department of Agriculture.

Future Research

Future research on biological control of yellow starthistle will include the following. There will be additional introductions of *C. australis* and *L. curtus* from Greece in 1994. Field evaluation studies have commenced to monitor populations of the established insects as well as their impact on yellow starhtistle and its environments. These studies are being carried out in cooperation with personnel from CDFA and UC. The host specificity of a rust disease (*Puccinia jaceae*, Uredinales) that attacks the leaves of the weed is under investigation at the USDA-ARS plant pathogen quarantine facility in Frederick, MD (Bruckart, 1989). Planning is underway for additional foreign exploration for natural enemies attacking the roots, stems, or leaves of the weed. Turkey is an area of great interest for further exploration research.

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