1980

# WRCC-42 "EVALUATION OF METHODS TO CONTROL RODENT DAMAGE TO HAY, RANGE AND GRAIN CROPS"

Agenda

WRCC-42 Meeting
Reno, Nevada Dec. 11 and 12, 1980

December 11

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|---|---|
| 9:00 a.m. | Welcome and Introduction<br>Ralph A. Young, Associate Director, Nevada Agr. Exp. Sta.<br>Paul T. Tueller, Administrative Advisor to WRCC-42<br>Committee members and visitors |
| 9:30 | Discussion of procedures for a WRCC and WRCC-42 in particular |
| 10:00 | Break |
| 10:20 | Discussion of Coordinating Committee objectives |
| 12:00 | Lunch |
| 1:30 - 5:00 | Presentation of research activities being conducted by the various committee members |

December 12

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|---|---|
| 8:30 a.m. | Continued presentation and discussion of research |
| 10:00 | Break |
| 10:20 - 12:00 | General discussion of committee concerns.<br>Election of committee officers.<br>Selection of next meeting time and place. |

MINUTES OF ORGANIZATIONAL MEETING

WRCC-42 "EVALUATION OF METHODS TO CONTROL RODENT DAMAGE TO HAY, RANGE AND GRAIN CROPS"
Reno, Nevada
December 11 and 12, 1980

The meeting was called to order by Paul Tueller, Technical Advisor, at 9:03 a.m.

Introduction of members present (see attached list).

Discussion of the question of whether to remain a coordinating committee or prepare a proposal to develop a regional research project - It was decided to remain a coordinating committee for one more year.

State and Agency Reports

U.S. Fish and Wildlife Service -

a) Sugarcane losses to rats in Hawaii and Florida are in excess of $80 million/year on the basis of 40¢/lb. sugar. Over $2 million/year damage to macadamia nut crop in Hawaii.

b) Northwest forests are incurring $75 million/year (non-capitalized) losses mountain beaver, pocket gophers, deer, elk, bear, etc.

c) Prarie dogs and ground squirrels are a westwide problem to crops and rangelands but no good estimate of total damage is available.

d) Studies on-going on hazards of control methods to non-target species.

e) Small number of scientists working on rodent damage research is a major problem today. Probably fewer than 40 individuals are involved.

Oregon -

a) Ground squirrel and pocket gopher research testing different toxicants and application methods.

b) Integrated Pest Management (IPM) program for predicting cost: benefits of control procedures.

Nevada -

a) Testing effectiveness of electronic devices.

b) Testing repellants for controlling deer in alfalfa.

c) Strychnine tests for efficiency on pocket gophers and ground squirrels.

d) Plant uptake of strychnine (2 times California rate) shows that uptake is none or minimal.

e) Field trials conducted on dates, times and carriers to increase bait acceptance for strychnine and 1080 baits for rodents. Field tests on rates of application and calibration of "burrow-builder" machines.

f) Dr. Steve Jenkins (Prof., Dept. Biol.) is studying autecology of Richardson's ground squirrel in northern Nevada.
Dr. Mead studying contamination of Richardson's ground squirrel with nematodes as biological control mechanism.

g) Brush control (various types) and the impact upon small mammals and birds are being studied (Includes seeding, spraying, burn, burn and seed, grazing system, etc.).

h) Saval Ranch studies on range management and impacts on wildlife species (relative abundance) and food habits of these species. Also includes food caches and their effect on seed germination.

South Dakota -

a) Ground squirrels, prairie dogs and pocket gophers are major problems. Need tools (methods) for control and research to document the benefits of toxicants and keep EPA from withdrawing various state labels.

b) Improper use of various illegal toxicants is becoming widespread among private farmers within the state because they can't get relief from other methods.

California -

a) Conducting field tests of new toxicant (Eli Lily 614, acute toxicant) for field rodents.

b) Field testing bromadialone (anticoagulant) for control of field rodents.

c) Testing Talon (brodifacoum; anticoagulant) for comensal rodent control. Talon has some secondary health hazard.

d) Bromadialone is registered for comensal rodent use under trade name MAKI.

e) Conducting raptor research in regard to secondary hazards of these compounds.

f) Conducting pocket gopher control on reforestation projects for U.S. Forest Service.

g) Have an IPM program to control rodents in campgrounds for plague control (USFS).

h) Studied electromagnetic devices and high-frequency sound as rodent controls and found negative results for both.

i) Studying the use of pheromones to manage rodents with Calif. Dept. of Food and Agriculture. This is a 4-year study to alter behavior which has not produced supportive data - only potential avenues for further study.

j) IPM projects in progress for alfalfa and grapes with almonds coming in future. This is an interview survey to determine size of problem, location, type of irrigation, etc., etc.

k) Evaluating cost of aircraft for distributing 1080 and zinc phosphide in ground squirrel control.

l) Evaluating tracking powders for control of house mouse.

m) Studying mountain beaver damage on forest seedlings.

n) Evaluating raptor perches and use to control field rodents.

o) Studying dispersal of young in California ground squirrel.

p) Studying grooming behavior of house mouse.

q) Studying retrieval and maternal care of California ground squirrel.

r) IPM project to computer model California ground squirrel in regard to population trends vs. levels and frequency of control practices. All data are coming from literature reviews for this study.

s) Doing compilation of vertebrate pest control labels for state of California (handbook for users).

t) Involved in RPAR process.

u) Collecting residue data on zinc phosphide in alfalfa and sugar beets (future).

v) Conducting assessment of ground squirrel damage to rangelands on control vs. treated areas.

w) Studies in progress on ground squirrel hibernation, energy budgets and rhythms.

x) Studying re-invasion by Belding ground squirrels in alfalfa.

Idaho -

a) Studying vole cycles in winter wheat vs. types of cultivation practiced. Some treatment differences, but nothing works whenever voles reach high density.

b) Townsend ground squirrel study (BLM funded) on Birds of Prey Natural Area involving phenology. Drought in 1977 caused zero reproduction in native rangelands but squirrel reproduced in alfalfa fields. Highest burrow counts have occurred in irrigated alfalfa fields.

c) Badgers have been found to have high resistence to Bubonic Plague.

New Mexico -

a) Brush control (chemical) impacts upon rodents, lagomorphs and song birds - a modeling effort.

b) Basic physiological studies of deer mice and kangaroo rats.

c) Effects of prairie dogs on vegetation - a seasonal food habits study.

d) Toxicant evaluation on pocket gophers on reforestation.

e) Efficacy tests on zinc phosphide - prairie dogs, kangaroo rats. No follow-up on secondary treatment but approximately 90% control on one-time only treatment.

Wyoming -

a) No research at Laramie.

b) Two problem areas are reclamation on coal strip mines and loss of seeds on area which have been re-seeded.

c) Ground squirrel densities of 1000/ha in alfalfa fields.

d) Investigations of food consumption and behavior are underway with an interest in dense vs. less dense populations.

Nebraska -

a) Problems with commesual rodents, prairie dogs and pocket gophers which impact on agriculture industries. Estimates project $10 to $25 in losses per rodent to the producer.

b) Prairie dogs and pocket gophers are damaging pastured and alfalfa fields. Recent studies estimate up to 50% loss in production on rangeland and 35 - 40% reduction alfalfa.

c) Integrated pest management (IPM) project was begun in September, 1978 to

    1) establish demonstration and evaluation projects of commensal rodent damage at swine production facilities.

2) assess economic damage of commensal rodents at swine production facilities with the ultimate goal of establishing an economic threshold for control.

3) establish relationships with various producer organizations to determine the extent and severity of rodent damage.

4) determine the impact of the IPM project on reducing rodent damage.

5) prepare instructional materials on rodent damage identification nad control techniques.

d) Cooperative Staff Efforts (R. Timm, R. Case and R. Johnson)

Additional rodent problems concerning pocket gophers, thirteen-lined ground squirrels and prairie dogs are in various stages of investigation. Specifically,

1) develop a computer program for use by extension agents or farmers/ranchers to determine cost:benefit analysis of pocket gopher control.

2) conduct laboratory and field studies on anticoagulant rodenticides for use in pocket gopher control.

3) conduct laboratory and field studies on anticoagulant rodenticides and repellents for use in thirteen-lined ground squirrel control.

4) assess economics of prairie dog control and investigate alternative methods for controlling prairie dog damage.

Election of Officers

Chairman - David deCalesta, Oregon

Vice-Chairman - Rex E. Marsh, California

Secretary - V. W. Howard, Jr., New Mexico

Integrated Pest Management (IPM)

Current/Past Investigation (State-of-the-Art) in rodent management can be summarized by the following categories of research:

1. Toxicants - acrite, anticoagulants, baits, tracking powders, fumigants, "grease gun" - efficacy and impacts.
2. Repellents
3. Predators (biological control).
4. Habitat manipulation.
5. Pheromones
6. Electromagnetic/ultrasonic
7. Basic ecology - food habits, movements, phenology, reproduction, hibernation, etc.
8. Damage assessment
9. Damage prediction
10. Economics - cost/benefit ratios
11. Plague
12. Models - population trends, habitat, damage
13. Control assessment programs.

Projected Needs

1. Assessment of crop loss - westwide thresholds
2. Residue data for toxicants
3. Efficacy data for new toxicants
4. Impact data - long-term effect of control efforts
5. Issue papers for each species - use U.S. Fish & Wildlife Service format
6. What are management needs within each of the western states? Identify, prioritize and design research needs.
7. Establish control methods to address nos. 1 and 6.

Management Needs

1. Priority for crops
   a) Irrigated grain and hay
   b) Non-irrigated grain and hay
   c) Rangelands

2. Priority for animals

   a) Pocket gophers - hay, range, crops
      Ground squirrels - hay, range, crops
   b) Prairie dogs - range, crops
   c) Jackrabbits - range, hay
   d) Kangaroo rats - range (seeding & revegetation)

Actions taken (December 13, 1980)

1. Petition to establish WRCC-42 "Evaluation of Methods to Control Rodent Damage to Hay, Range and Grain Crops" was revised by the committee membership in order to allow for editorial comment and to more clearly reflect the feelings of all committee members.

2. Discussed a format for states to assess damage within their boundaries. Agreed to review format currently used by California to see if it could be adapted.

3. Identified a need for a standardization of information to determine research needs. The following sources were listed:

   a) Literature relative to problems in individual states can be found in Experiment Station publications, Extension reports, M. S. Thesis, State Department of Agriculture, Game and Fish Departments, State Department of Public Health.
   b) Contacts include extension agents and specialists
   c) Farm Bureau - St. Dept. Agriculture
   d) U.S. Fish & Wildlife Service - Animal Damage Control
   e) Selected sampling of farmers and ranchers
   f) Individual researchers of scientific community
   g) Crop reporting service - USDA
   h) Denver Research Center (literature search)

4. Information to be sought includes crops affected, rodent species doing damage, locations within states, economics

5. Documentation Process

   a) Survey and follow-up interviews for selected respondents
   b) Have California's interview questionnaire reviewed by pollsters and economists

Next Proposed Meeting

December 1 & 2, 1981 - - Reno, Nevada

Submitted by: Approved by:

V.W. Howard, Jr., Secretary

David deCalesta, Chairman

AGENDA

WRCC--42 "EVALUATION OF METHODS TO CONTROL RODENT DAMAGE TO HAY, RANGE, AND GRAIN CROPS"

Knudtsen Renewable Resources Center
University of Reno, Nevada
December 1-2, 1981

December 1

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|---|---|
| 9:00--9:20 | Welcome<br>Paul Tueller, Adminsitrative Advisor, Reno, Nevada |
| 9:20--9:40 | South Dakota Rodent Damage Survey<br>Vern Brakke, South Dakota Department of Agrigulture |
| 9:40--10:00 | Effectiveness of Chemical Control for Prairie Dogs<br>Ernest Hugghins, South Dakota State University |
| 10:00-10:20 | Costs and Efficacies of Poison Baiting and Shooting for Control of Ground Squirrel Damage to Alfalfa<br>David S. deCalesta, Oregon State University |
| 10:20--10:40 | Update--Rodent Damage Control in Nebraska<br>Ron Case, University of Nebraska--Lincoln |
| 10:40--11:00 | Coffee Break |
| 11:00--11:20 | Update--Rodent Damage Control in Montana<br>Monty Sullins, Montana Department of Agriculture |
| 11:20--11:40 | Update--Rodent Damage Control in Idaho<br>Don Johnson, University of Idaho |
| 11:40--12:00 | Update--Rodent Damage Control in New Mexico<br>V. W. Howard, New Mexico State University |
| 12:00--1:30 | LUNCH |
| 1:30--5:00 | Reports from Other States and Agencies |

December 2

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| 9:00--10:30 | Unfinished Reports |
| 10:30--12:00 | Business Meeting |
| 12:00 | ADJOURN |

WRCC-42

EVALUATION OF METHODS TO CONTROL RODENT DAMAGE
TO HAY, RANGE AND GRAIN CROPS

December 1-2, 1981
Reno, Nevada

Dr. David deCalesta, Chairman, called the session to order at 9:00 a.m., had those present introduce themselves and turned the meeting over to Dr. Paul Tueller, Administrative Advisor.

Dr. Tueller gave a brief introduction to the purpose of WRCC-42 and explained the use of Regional Research Funds for Western Regional Coordinating Committees and Western Regional Research Projects. The committee should consider whether to prepare a proposal for research project or to petition for continuation as a coordinating committee after 1982.

The following are summaries of verbal reports given for those states and agencies which had personnel present at the meeting.

1. Vern Brakke - South Dakota Department of Agriculture -
   Early surveys had estimated total agricultural losses to be between $5 and $30 million. It was known that 160,000 lbs. of strychnine oats and 40,000 lbs. of ZP oats were produced and dispersed in 1980, but there were no data on how effective these efforts had been. In addition, there were no recent data on how much economic damage was being done throughout the state. The survey of economic losses included 9000 mail questionaires being sent with 2400 being returned. However, only 1400 were usable so telephone follow-up were utilized to obtain an additional 1300 responses. Estimates reported were validated by telephone calls to various state agencies which could provide data on land values, crop damage, etc. Total economic loss to pasture, range and crops caused by prairie dogs, pocket gophers and ground squirrels was $27.2 million in 1980. Write to Vern Brakke for copies of the questionaire and the report.

2. Ernest Hugghins - So. Dakota St. University

Reported on chemical control of prairie dog using ZP rolled oats. Some problems were encountered including (1) bait sticking to metal of drop-tube (2) water washing ZP from the oats and (3) pre-baiting cost. In addition there are problems with masking the odor and taste of ZP. Hooker Chemical Co. manufactures a micro-incapsulated ZP bait but prairie dogs do not accept the bait.

3. David deCalesta - Oregon State University

Reported on Belding ground squirrel damage to alfalfa hay, evaluation of damage and cost effectiveness of several control methods including strychnine and 1080 oats provided by a commerical distributor used in bait stations, spot baits and broad cost. Shooting as a single control on some fields also was evaluated. There was some non-target loss of blackbirds even when using dyed (green) baits.

| | Broadcast | | Spot | | Bait Station | | Shooting | |
|---|---|---|---|---|---|---|---|---|
| | '80 | '81 | '80 | '81 | '80 | '81 | '80 | '81 |
| Cost/ac | 2.50 | 2.50 | 3.00 | - | 2.50 | 10.00 | 12.00 | 54.00 |
| Damage Reduction | 35% | 30% | 0% | - | 35% | 30% | 0% | 70% |
| Cost/Benefits* | 0.12 | 0.1 | Lost $ | | 0.12 | 0.42 | Lost $ | 1.1 |

* all data are for one-year-only, no carry-over effect was measured.

4. Ron Case - University of Nebraska - Lincoln

Reported plains pocket gopher damage to rangelands resulted in 21-49% reduction in forage production. Copies of this report and reports of plains pocket gophers are available from the university. A new study is being initiated to determine losses to irrigated pasture. It will determine cost: benefit of control and economic value of long term effects. Bob Timm has been conducting an

integrated pest management (IPM) program with swine producers in Nebraska to gather data on structural losses from commensal rodents. This project is being expanded to be state wide and will include poultry, beef cattle and feed and grain storage operations. There are some problems with prairie dogs in northwestern Nebraska rangelands which are being handled as an Extension Program to show landowners how to control prairie dogs, check for ferrets, proper range management practices, etc. Kangroo rats are eating planted grains prior to germination in some areas. Overtreatment with strychnine baits caused some non-target losses to mourning doves.

5. Monty Sullins - Montana Dept. of Agriculture

Montana has several programs going including a program to license pesticide applicators Extension Service educational programs for the public.

A 1080 program to control Columbian ground squirrels including 118,000 acres cleared for control, but only 64,000 acres treated.

Research programs mainly for damage assessment, efficacy testing, delivery mechanisms and economic losses to barley and hay crops.

Estimated $1.4 million loss to Columbian ground on irrigated crops in areas with no control program. ZP oats has not been effective for controlling Columbian ground squirrels.

Results of a mail survey estimated $10 million in damage to rangelands, mainly prairie dogs. Some work has been done on ZP, strychnine and 1080 efficiency testing on grains. Pre-baiting costs make control more expensive. ZP grain is not effective when it rains. The 8 oz. pelleted ZP bait/burrow did control prairie dogs but posed non-target hazard.

Rodent control on federal lands is a current hot issue as in South Dakota.

6. Don Johnson - University of Idaho

Research has been conducted on Townsends' pocket gopher to determine their effect on seeding producing alfalfa (a report is available from Don).

Other areas need research but these will be initiated as funding becomes available.

7. V.W. Howard, Jr. - New Mexico State University,
Mike Bodenchuk - New Mexico Dept. of Agriculture

Research progress on efficiency of .16% and .50% strychnine oats and ZP pellets (AG) to control kangaroo rats. Seasonal effects are being studied in addition to bait efficacy.

Reported on prairie dog food habits/range condition study which was completed in 1981.

Prairie dog density survey has been completed on state and private lands.

Efficacy of Mag-disc and Phostoxin to control prairie dogs was 96% and 88% control, respectively. Cost was $.30/burrow including labor. These work well where ZP cannot be used for prairie dogs (near dwellings or poultry).

Discussed policies of prairie dog and rodent control on federal lands in New Mexico. Some loosening of restraints in past year.

NMDA has applied for an aerial application label for kangaroo rat control, but this label has not been approved by EPA.

8. Rex Marsh - University of California - Davis
Walter Howard - University of California - Davis

Reported on studies using Eli Lilly compound EL-614 (Bromethalin) for commensal rodent control.

Talon (Brodifacoum) (ICI product) for control of ground squirrels in California. Talon treatment was mostly aerial at rate of 6 lb./swath-acre (treat a 50 ft. swath, skip 150 ft. then treat another 50 ft. swath) and had over 90% control. Non-target and secondary hazard were checked. This treatment significantly reduced kangaroo rats. Most of the bait was cleaned up by the end of the second day (death occurs 4 to 10 days after bait ingestion). Very few carcasses were found above ground, thus reducing chances of secondary poisoning.

Bromadilone (Maki) a single dose anticoagulant is being studied in the laboratory.

A pocket gopher control project in conjunction with reforestation is on going. There is a need for an evaluation of the season of burrowing activity in order to determine the best time to control.

IPM alfalfa project is ongoing using personal interview questionnaries.

IPM on grapes is in progress.

A Ph.D. student is studying dispersal of young and adult Spermophilus beechyi into artificially created voids.

Starting a study on reinvasion of Belding's ground squirrel following control.

Developing several pest rodent population models to access the effects of various levels of control to ascertain economics of control practices (T.P. Salmon's project).

The major problem with control when using treated baits is the need to use different baits and/or poisons to achieve higher levels of control. The next few percentages, above 90% control can make a lot of difference economically.

9. John Seubert - U.S. FWS - Denver Research Center

The present research program at the Denver Wildlife Research Center concerning non-predatory mammals emphasizes the following:

Developing plotless density estimators of rat damage to Hawaiian sugarcane, to provide a vital component of an IPM program for sugarcane. The new estimators will have other applications.

Developing and evaluating methods for controlling rat damage to Florida sugarcane. Current work involves the development and evaluation of baiting techniques.

Obtaining better data on the extent of the economic losses caused by non-predatory mammals in forests, rangeland, and agricultural crops.

Assessing the primary, secondary, and non-target hazards of mammal control chemicals. A study presently is underway in Virginia to determine the secondary hazard "Voild" (brodifacoum) bait when used to control orchard mice. Radio telemetry is being used to monitor owls to determine if the consumption of Volid treated mice causes them harm.

Based on recent studies, Pival and Fumerin are no longer used to control rats at the edges of Hawaiian sugarcane, because of the primary exposure of the bait to wild pigs.

Developing methods for controlling forest depredations by mountain beavers, pocket gophers, and deer.

Assessing the potential of chemical repellents for a mammal damage reduction.

Developing a new gas cartridge that uses carbon monoxide as the lethal agent.

Developing the data required for a Federal registration for zinc phosphide for use on Richardson's ground squirrels.

Conducting basic laboratory toxicological studies on a variety of rodenticides and rodents.

Describing the hibernation behavior of Richardson's ground squirrel in Colorado.

Details about these studies will be provided upon request.

* Note - If anyone has a need for information regarding markers in rodents, contact Brad Johns at the Denver Wildlife Research Center.

10. John O'Brien - Nevada Dept. of Agriculture

Reported on field trials of various products to control ground squirrels and kangaroo rats in Nevada. Copies of results of these trials are available. Rain affected level of control if it occurred shortly after application of baits.

Pocket gopher baiting is one of the biggest problems (using strychnine milo and wheat).

Pocket gophers become trap-shy when missed on first attempt.

## BUSINESS MEETING

Called to order by Chairman deCalesta at 9:51 a.m. on December 2, 1981.

Old Business -

The proposed regional telephone survey for damage estimates was discussed at length including possible sources of funding (IR-4, EPA, etc.).

There was considerable discussion on whether to do a regional vs. individual states survey.

Resolved - 1. Vern Brakke and David deCalesta will investigate sources of funding and agencies which might be able to conduct the survey (regional).

2. David deCalesta and Rex Marsh will accumulate current information from the current WRCC-42 membership on which crops and which rodent pests are important to each state. They will compose a rough draft of a questionnaire to circulate for comments from the membership.

New Business -

Discussion of meeting place, time and activities for 1982.

Resolved - Meet in California (probably Sacramento) on December 2 & 3, 1982 with an optional field trip on the following day.

Discussion of how to generate more membership participation from other agencies with rodent problems.

Resolved - Specifically invite agency personnel from BLM, USFS, and BIA who have rangeland rodent control interests.

Election of Secretary for WRCC-42,

Walter Howard nominated Ron Case.

Seconded by John Seubert.

Ron was elected by acclamation.

Ron Case will solicit a list of publications on rodent research during the past 5 years for rangelands, hay and grain crops from the membership.

Chairman - Rex March, California

Vice-chairman - V.W. Howard, Jr., New Mexico

Meeting adjourned at 11:43 a.m.

Respectfully submitted by:

V. W. Howard, Jr.
Secretary WRCC-42