

The Wyoming Mosquito

Welcome to the third issue of 1995. Note that it is time to renew your membership to the Association. A membership renewal form is on the last page of this newsletter. Also, please note that the 1996 annual business meeting will be held during the meetings in Greeley, Colorado. We encourage you to attend. Should you be unable to attend, look for a special newsletter issue after the meeting (the last one for "1995").

Please feel free to redistribute this newsletter to other parties that may be interested. Any mention of a specific control material is for educational purposes only and does not necessarily constitute a recommendation by the Wyoming Mosquito Management Association or UW. The editors this year are Mike Brewer (University of Wyoming) and Bob Alexander (City of Sheridan). A major goal of the newsletter is to assist in communication among the members. Please send your contributions to Mike Brewer, Department of Plant, Soil, and Insect Sciences, University of Wyoming, P.O. Box 3354, Laramie, WY 82071.

Mosquito news throughout the state

Time to renew your membership to the Association.

A membership form for renewal or for new members is on the last page of this newsletter.

1996 annual business meeting. Submitted by Kathy Holder, Casper and Natrona County Health Department.

The 1996 annual business meeting will be held in conjunction with the 1996 annual meeting of the West Central Mosquito and Vector Control Association meeting February 21 and 22 as per vote of the membership at last year's business meeting. The meeting site is the Ramkota Inn, in Greeley, Colorado. Rooms at the Ramkota Inn are \$45 single, \$53 double, or \$61 triple, plus tax. Reservations can be made by calling 970-353-8444. During this meeting there will be presentations regarding research, operational activities, and case investigations throughout the west central United States. See the article by Ed Schmidtman (Topics section of this newsletter) as an example of the type of presentations that will occur at the Greeley meeting. This is a valuable opportunity for us to participate in a regional meeting.

UW course offering available throughout the state: "CURRENT TOPICS IN INSECTS OF PUBLIC HEALTH IMPORTANCE"

Submitted by Michael Brewer, University of Wyoming

A return of the one credit hour short course in entomology emphasizing public health will be offered next year by Jack Lloyd through the UW Extended Studies program. Using televideo conferencing, students may attend the class at any community college site in Wyoming. Students will be able to discuss the current concepts in public health entomology with Jack and fellow public health workers throughout Wyoming using this interactive media. For more information on times, dates, course highlights, and enrollment information, see below or call UW Extended Studies program at 800-448-7801, ext. 5. Class schedule catalogs are also available through your local community college.

Class: ENTO 5689, Current topics in insects of public health importance

Instructor: Jack Lloyd

Credit hours: 1

Course description: This course is designed so that the student may appreciate the public health importance of insects and related arthropods. Emphasis will be on insects of public health importance in Wyoming and neighboring states. Study will include direct affects of insects as well as involvement as vectors of several important diseases of man and animals. The course will provide the student with skills to recognize and manage insects of public health importance. Control or management strategies, as well as the rationale behind those strategies, will be discussed. The Wyoming Department of Agriculture has been requested to recognize this course as fulfilling the continuing education requirements for recertification of those holding the Certified Commercial Applicators license in Public Health.

Prerequisites: Jr. or above or consent of instructor (those with informal training through workshops and work experience are encouraged to participate).

Media Support: Compressed video

Day/time: Thursdays, 8:00 - 10:30 AM, January 25 - February 29, 1996

Location: Casper, Cheyenne, Gillette, Green River, Jackson, Laramie, Powell, Riverton, Rock Springs, Sheridan, Torrington

Enrollment: Enrollment is administered through the UW Extended Studies program, telephone: 800-448-7801, ext. 5. Students are welcome to enroll in the course for a letter grade or S/U option or audit the course.

Biosketch: John E. Lloyd, Professor of Entomology, received the B.S. degree from Pennsylvania State University in 1962 and the Ph.D. from Cornell University in 1967. His teaching interests include veterinary entomology and parasitology, medical entomology, insecticide toxicology, and insects for teachers. Jack is an active member of the American Mosquito Control Association and the West Central Mosquito and Vector Control Association, and he has participated in numerous workshops dealing with the biology and management of insects of medical and veterinary importance.

Topic updates

Arthropod-borne diseases:

Western Equine Encephalitis, Lyme Disease, and Vesicular Stomatitis

Reported cases of WESTERN EQUINE ENCEPHALITIS in humans in the state of Wyoming, 1995. Information provided by Todd S. Klietz, Wyoming Department of Health, based on a survey done in Goshen County, Carl J. Mitchell, CDC, Fort Collins.

Virus isolates from Goshen County mosquitoes have been assessed.

1. The August 10, 1995 collection yielded 10,958 mosquitoes. These were tested in 165 pools by plaque assay in Vero cell culture.
2. About a dozen species were represented in the collections, but a high proportion of these were *Aedes vexans* (70.5%) and *Culex tarsalis* (21.8%).
3. Eleven virus isolates were made from the 49 *Cx. tarsalis* pools tested. The strain designations and their origins follow:

WY95-888, Recycle Road, Torrington, WY

WY95-820, -830, -832, -845, -857, -858, -862, and -863,
all came from the nature preserve south of Torrington

WY95-950, Torrington Golf Course

4. Goro Kuno identified WY95-888 as WEE virus by PCR, and Nick Karabatsos confirmed this by IFA. Nick also identified strain WY95-858 as WEE virus by IFA.

Based on these results, there is no cause for alarm. The 2 WEE isolates may simply represent "normal" WEE virus activity at this time of year in the Torrington area (we do not have any baseline data for comparison). On the otherhand, the threat of some transmission occurring is certainly present and this threat could continue for another couple of weeks.

The infected *Cx. tarsalis* represent the remnant of the blood-feeding summer population, and this segment of the population will continue to die off.

Most, if not all, *Cx. tarsalis* emerging as adults since about the middle of

August in the Torrington area will be programmed for diapause as a result of decreasing daylengths. This segment of the population will not blood-feed this season, but will build fat bodies by feeding on plant carbohydrates and enter hibernation as inseminated females. These females will emerge in the spring to take blood and reinitiate the mosquito breeding cycle.

Also, passerine birds such as house sparrows will have completed their breeding season in the Torrington area. Therefore, significant further WEE virus amplification at this late date is highly unlikely this season.

Background on WESTERN EQUINE ENCEPHALITIS, information compiled by Mike Brewer from various public domain sources including an extension publication produced by University of Minnesota by R. Smith and J. O. Hanson and notes from Gayle Miller, Wyoming Department of Health.

Western Equine Encephalitis (WEE) first became a concern of horse owners of the United States in the 1930s. Subsequently, the disease has recurred on a cyclic basis. WEE virus is found in the United States, Canada, and south to eastern South America, especially in areas heavily populated with mosquitoes. Western Equine Encephalitis is an inflammation of the brain. It is also called "sleeping sickness." WEE is caused by a virus in the blood and tissues of the infected animal, which attacks the brain and causes various disturbances of the nervous system.

HOW IS IT TRANSMITTED?

The natural cycle for this virus includes mosquitoes and certain wild birds. The virus usually develops within the body of the mosquito, *Culex tarsalis*. When an infected mosquito feeds on a bird, the virus may enter the bird's bloodstream during the "bite" (the mosquito's mouthparts pierce the skin of the bird and suck blood). The virus multiplies in the bird's blood. It remains in the bloodstream where it may be taken into a new mosquito during another blood meal. The cycle may then be repeated.

WHAT ANIMALS ARE ADVERSELY AFFECTED?

Although mosquitoes and birds harbor the virus naturally, neither exhibits any signs of the disease. The only animals severely affected when exposed to the virus are horses and humans.

HOW DO HORSES AND HUMANS GET THE DISEASE?

The natural method by which horses or humans contact the disease is through the bite of a mosquito which is carrying the virus.

CAN HORSES OR HUMANS ACT AS CARRIERS?

Rarely. The principal mosquito involved prefers to feed on birds. Only occasionally does it feed on a horse or human. When a mosquito does bite a horse or person, the virus initially enters the bloodstream; but very shortly thereafter, it enters the tissues and is not available for a new mosquito to pick

up. Consequently, both horses and people serve as "dead-end" hosts and rarely as a source of infection. Because they are not carriers, quarantine of infected horses is not a method to retard the spread of the disease.

WHAT ARE THE SIGNS OF WEE IN HORSES AND WHEN DO THEY APPEAR?

Signs usually show up within 5 to 15 days after exposure. The infected horse develops a fever and impaired vision together with a general state of depression and drowsiness. The animal may have very little energy, and may hang its head. This may be followed by difficulty in eating and swallowing due to a paralysis of the throat. The horse may stop chewing its food. As uncoordinated behavior progresses further develops, the horse may stumble and stagger. Some horses may become totally paralyzed, and die. High mortality rates in horses are of great concern.

It is very difficult to determine by clinical signs alone whether a horse has WEE. The signs mentioned above can be caused by a variety of other diseases, so it is important to contact your veterinarian to examine the animal. A blood sample is usually collected for serological testing to determine whether WEE is the cause of the illness. Regardless of difficulty in diagnosis by clinical signs and the likelihood that the horse will recover, it is critical that the disease is diagnosed properly and the disease reported to the Wyoming Department of Health, County Health Department, or the county health officer. Disease in horses is a sign that there are vectors with the virus in the area. Vaccines are available for horses and effectiveness lasts about a year.

WHAT ARE THE SIGNS AND SYMPTOMS IN HUMANS?

There are lower incidences of the disease in humans, and there are cases of inapparent infection. In general, infection with WEE (like SLE and California Encephalitis [CE] results in principally mild and inapparent infection as compared to Eastern Equine Encephalitis (EEE). In WEE, the ratio of inapparent to apparent (diagnosed) infections may be as high as 58:1 in children and 1150:1 in adults based on previous studies. Fatalities are rare (case-fatality rates = 3 to 4%). Thus, the principal concern stems from the chance of adverse sequelae (related to CNS damage) after encephalitis, principally in children or older adults.

In the active stages of the disease, people generally show a sudden onset of fever and headaches, followed by neck stiffness, nausea, vomiting, drowsiness, and disorientation. These symptoms usually reach their peak in 2 to 5 days after onset, followed by a slow recovery. It is important to realize these same signs can also be caused by many other disease conditions. It is critical that the disease is diagnosed properly and the disease reported to the Wyoming Department of Health or the county health officer.

There is no treatment against the invading virus, but good nursing care and supportive therapy may help in mild cases of the disease.

HOW CAN WE BE PREVENTED?

Since the mosquito carries the disease-causing virus, most control measures are directed against this insect. In our area *C. tarsalis* and *Culiseta inornata* are known vectors of the disease and can be abundant. Control methods include 1) killing of mosquitoes by appropriate pest control measures, 2) wearing proper clothing for protection while outdoors, and 3) using insect repellents. Another control procedure includes draining swampy areas, areas with stagnant water due to run-off. It is in these areas that the particularly important vector, *C. tarsalis*, prefers to breed.

Reported cases of Lyme disease in the state of Wyoming, 1994.

Information obtained from the Lyme disease surveillance summary, Centers of Disease Control and Prevention.

Five cases of Lyme disease were reported in 1994. In contrast, over 9,000 cases were reported in 1994 from the New England area. It is believed that the cases in Wyoming result from infected people coming to state or returning to the state after a visit to areas of higher incidence. For Montana, South Dakota, Nebraska, Colorado, Utah, and Idaho (our neighboring states), the total number of reported cases in 1994 was 9. See the following for vector information.

TICK IDENTIFICATION: DISTINGUISHING *Dermacentor andersoni* FROM THE *Ixodes* species

Submitted by Rabinder Kumar and Michael Brewer, Department of Plant, Soil and Insect Sciences, University of Wyoming

The known vectors of Lyme disease are ticks in the genus *Ixodes*. The deer tick, *Ixodes dammini*, is found primarily in the east and east central part of the U.S. and is implicated as the prime carrier of the spirochete responsible for Lyme disease. The western black-legged tick, *Ixodes pacificus*, found along the Pacific rim is also involved to a lesser degree. To our knowledge, these ticks have not been reported in Wyoming. The black-legged tick, *Ixodes scapularis*, is responsible for Lyme disease spread in the southern part of the United States. Again, these known vectors of Lyme disease have not been reported in Wyoming; but there have been 9 cases of Lyme disease reported in Wyoming in 1991. We feel it is prudent for health workers to be able to distinguish the *Ixodes* ticks from the very common Rocky Mountain wood tick, *Dermacentor andersoni*. We provide here diagrams showing some morphological features that distinguish *Dermacentor andersoni* from the *Ixodes* species.

Distinguishing *Dermacentor andersoni* from the *Ixodes* species

Ticks in the genus *Ixodes* are relatively small (about 3.2 mm in length) in size as compared with *Dermacentor andersoni*, the Rocky Mountain wood tick (about 3.8 mm in length). We hope that these diagrams will aid you in identifying these ticks. Magnification (25 to 30 power) is necessary. If you do not have access to

a dissecting scope, medical or veterinary workers in your area may be of assistance. Should you feel that you have identified a tick of the genus *Ixodes*, please contact a local or state public health agency or Rabinder Kumar and Michael Brewer, Department of Plant, Soil and Insect Sciences, University of Wyoming. Please save the tick in alcohol.

a dissecting scope, medical or veterinary workers in your area may be of assistance. Should you feel that you have identified a tick of the genus *Ixodes*, please contact a local or state public health agency or Rabinder Kumar and Michael Brewer, Department of Plant, Soil and Insect Sciences, University of Wyoming. Please save the tick in alcohol.

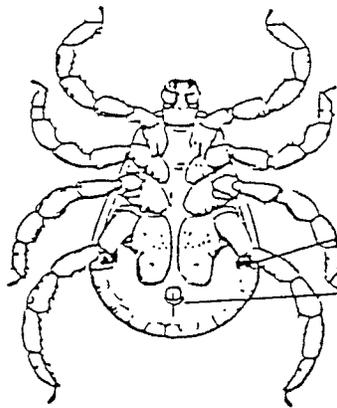
Identification of some selected ticks (Family: Ixodidae)

Dermacentor andersoni

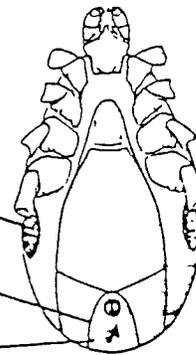
Ixodes species

1. anal groove behind anus, not attaining posterior margins of body

1. anal groove extending as an inverted "U" from in front of anus to posterior margins of body



spiracular plates
anal grooves
anus



(Ventral View)
abdomen

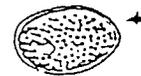
(Ventral View)
abdomen

2. spiracular plate with dorsal prolongation

2. spiracular plate without dorsal prolongation



spiracular plate



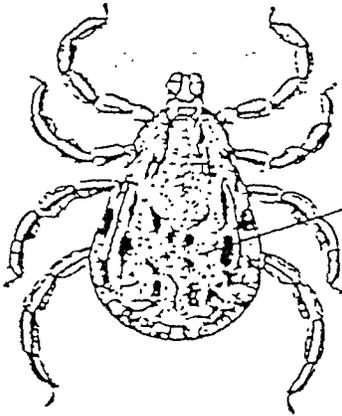
spiracular plate

Dermacentor andersoni

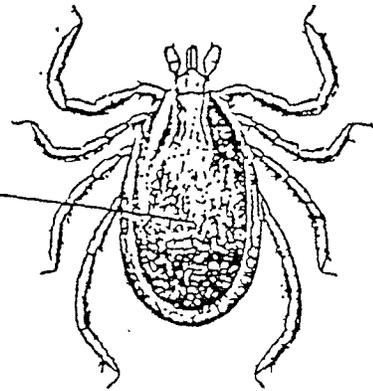
Ixodes species

- 3. Ornate ticks with some white markings on the dorsal shield

- 3. Inornate ticks without white markings on the dorsal shield

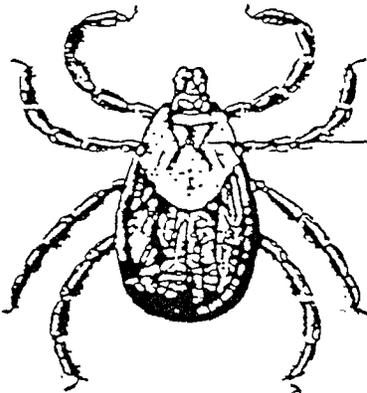


(Dorsal View)
male

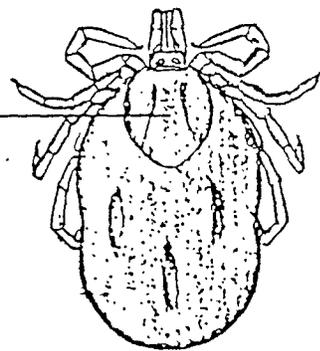


(Dorsal View)
male

dorsal shields



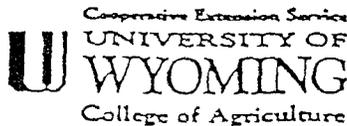
(Dorsal View)
unengorged female



(Dorsal View)
partially engorged
female

dorsal shields

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Michael Brewer
Michael Brewer
Specialist, Entomology

Summary of the 1995 outbreak of Vesicular Stomatitis in the Rocky Mountain region.

Information prepared by Ed Schmidtman, Research entomologist, Arthropod-borne Animal Diseases Research Lab, Laramie, WY

The 1995 epizootic (outbreak) of Vesicular Stomatitis (VS), like earlier VS outbreaks in the Rocky Mountain Region in 1966 and 1982, started near the Mexico border in early summer, spread northward during the warm weather months, and ceased in late fall. Most clinical disease occurred in horses, 283 of 367 (77 %) of premises with initially reported cases, but cattle, with 83 initially reported premises, and one llama, also were involved. As is typical of VS outbreaks, animals with sub-clinical disease (non-detectable symptoms) outnumbered clinically sick animals. Also, the disease itself was not fatal, as the deaths of animals with VS in 1995 appears to be due to other causes. No human cases were recorded in 1995, although VS virus can infect people. New Mexico (186 cases reported) and Colorado (138 cases) experienced the greatest prevalence of disease, with fewer reports from Wyoming (8 cases), Utah (6 cases) and Arizona and Texas with one case each. As of December 5, 1995, 349 of 367 VS positive premises have been released from the 30 day quarantine against movement of animals; cases remain under quarantine in Utah (3) and Colorado (15).

A major issue of the 1995 outbreak was the setting of a ten-mile radius zone around infected premises, from which livestock movement was prohibited for 30 days after the last lesions healed on sick animals. This regulatory action was established by the State Veterinarians of Mountain Region to help control the spread of VS, which is highly contagious and readily spread by contact from animal to animal. Because of its contagious nature and the similarity of VS to a more serious livestock disease, inter-state and International quarantines also were imposed against movement of VS-infected animals from infected states and the Rocky Mountain region. These restrictions blocked the movement and sale of livestock, causing strong economic losses. Additional losses resulted from the direct effects of VS that compromises milk production and increases cull rates in dairy cows and interferes with weight gain in beef cattle. The ten-mile restricted-animal movement zone was dropped in late October.

Because VS occurs during the summer months, when insects are most active, occurs frequently in livestock grazed on pastures along rivers where the immature stages of insects like black flies, biting midges and mosquitos are found, insect activity is considered to be a method by which VS virus spreads from animal to animal and area to area. Also, VS virus has been recovered from several groups of insects during outbreaks, and laboratory studies have demonstrated an increase in virus levels and infection of the saliva of black flies, several species of which are common pests of livestock throughout the Rocky Mountain region. Accordingly, in cases where direct animal to animal contact can be ruled out, the spread of VS virus by insects may occur, but information about which insects actually transmit (spread) the virus in nature needs to be investigated.

Some guidelines for reducing the risk of exposure to VS virus are as follows:

- 1) Separate animals with VS lesions (clinical signs) from healthy animals, preferably by stabling.
- 2) As a precautionary measure, do not move animals from premises affected by VS - unless they are going directly to slaughter- for at least 30 days after the last lesion has healed.
- 3) Start an on-farm insect control program that includes reduction of insect breeding areas and use of insecticide sprays or use of treated eartags on animals.
- 4) Use protective measures when handling affected animals to avoid human and other animal exposure.
- 5) Report suspect animals that may have VS to State or Federal animal health authorities.

**WYOMING MOSQUITO MANAGEMENT
ASSOCIATION
(WMMA)**

MEMBERSHIP REGISTRATION

(PLEASE PRINT)

NAME _____

NAME OF COMPANY OR ENTITY _____

ADDRESS _____

CITY _____ STATE _____ ZIP _____

PHONE _____

DUES:

\$10.00 PER YEAR FOR INDIVIDUALS

\$50.00 PER YEAR FOR SUSTAINING ORGANIZATION

PLEASE MAKE CHECKS PAYABLE TO:

WMMA

1200 E 3RD ST.

CASPER, WY 82601

DUES INCLUDE: MEMBERSHIP AND NEWSLETTER

MESSAGE FROM THE SECRETARY. SUBMITTED BY KATHY HOLDER

1996 is upon us and that means it's time to renew your membership to the Wyoming Mosquito Management Association. A membership form for renewal or for new members is on the last page of this newsletter. Please fill it out and send your dues to Kathy Holder, City of Casper-Natrona County Health Dept., 1200 E 3rd St., Casper, WY 82601. The Association looks forward to another educational and productive year. Thank you for your cooperation and participation.