UNIVERSITY OF CALIFORNIA COOPERATIVE EXTENSION
KINGS COUNTY

DAIRY NOTES

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West Nile Virus – How Dairies Can Help "Fight the Bite"

West Nile Virus is here in a big way! The South Valley leads the state in the number of human cases of WNV. As of July 29th, 56 cases of human WNV infections had been identified in California. Nearly half of those human cases were in Kings, Tulare and Kern counties. The first death in California related to West Nile this year occurred in Kings County on July 21st.

WNV is transmitted by mosquitoes. Mosquitoes acquire the virus when they feed on infected birds, which are the natural host. Although most birds infected with WNV do not suffer any illness, some get sick and die. An increase in the number of dead birds can be an indication that WNV is present. Local, state and federal agencies have been sampling dead birds for the presence of WNV since it first arrived in California in 2003. During the last two weeks of July 2005, half of the 731 dead birds collected statewide tested positive for WNV. Many of those were from the South Valley.

Infected mosquitoes can spread the virus to people or animals. Most people who are bitten by an infected mosquito will not become sick and those that do usually only develop flu-like symptoms. In some cases, a more serious neurological condition in humans leading to disability or even death can develop. Animals can also acquire WNV from infected mosquitoes, but few develop disease. Horses are the exception. Last year 540 WNV cases were reported in horses. Nearly half of those died or had to be euthanized.

Dairies can do their part to help curb the spread of WNV by eliminating mosquito breeding sites. Mosquitoes need quiet, standing water to successfully reproduce (see life cycle that follows). Manure storage ponds on dairies can become a significant source of mosquitoes. The good news is that ponds can be managed to prevent mosquito breeding. For many years local mosquito abatement districts have sprayed dairy ponds for mosquito control. Unfortunately, storage ponds choked with weeds and manure solids are difficult or even impossible to spray.

Weeds provide sheltered water for mosquitoes and they also prevent larvacide sprays from reaching the surface of the water. Floating solids can support growth of weeds and also restrict wind action on the pond surface. Weeds are the easiest to deal with. The best course of action is to control weeds on pond walls with herbicides or soil sterilants early in the spring. If that fails (or more likely never gets done) vegetative growth must be sprayed with herbicides. Any weeds, dead or alive, that are at or near the water's edge must be removed.

Floating solids and sandbars are more problematic. Most dairies constantly struggle to keep solids from entering ponds by various means not so much for mosquito control, but because solids reduce storage volume. Solid separation systems aren't perfect and eventually all dairies deal with manure solids in the pond. The summer irrigation season is a good time to circulate fresh ditch or well water through the storage pond to stir up and flush out as much of the accumulated solids as possible. Tractor mounted PTO driven choppers or floating agitator pumps can help disburse fibrous islands of solids. Professional excavating or dredging services may be necessary in ponds heavily loaded with solids.

If your ponds have weeds that need to be removed and you can't get it done, hire someone. Mosquito abatement districts have the authority to issue substantial fines. Fines have not been issued to dairies in the past, but public health concerns about WNV make it a very real possibility. Please, no more front-page dairy headlines! Do your part to help "fight the bite" and reduce the risk from WNV.

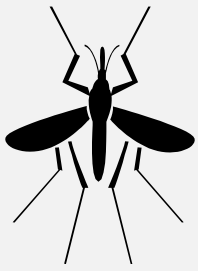
Life Cycle of the House Mosquito

There are many species of mosquitoes in California, and all pass through four stages to their life cycle- the egg, larva, pupa and winged adult. Because water is essential for egg laying and hatching, and for development of larvae and pupae, the first three stages are spent in standing water. In about a week, the adult (male and female) mosquito emerges from the pupae and leaves the breeding place to mate and feed, and in the case of the female, to return to the breeding place to lay eggs. Before egg laying, she normally takes a blood meal from any available warm-blooded animal – birds, cattle, horses or people.

In manure storage ponds, only one mosquito species is normally found. Its scientific name is *Culex quinquefasciatus*; commonly called the "house mosquito". Another common name is "foul water mosquito" because of its preference for unclean water as a breeding place.

Normally, eggs are laid in manure storage ponds in selected sites overgrown with weeds or in areas matted with floating material. The female may live 2 to 3 weeks and can lay as many as 40 to 100 eggs in a single batch every 3 to 4 days. The life cycle from egg to adult can be completed in 5 to 7 days. With such a rapid reproduction rate, adult mosquito populations can build up quickly to enormous numbers. The female mosquito can fly long distances from the breeding place in search of a blood meal and may cause a severe nuisance as well as a public health concern to communities four or five miles away from heavy mosquito producing manure storage ponds.

Reference: Planning Dairy Wastewater Systems for Mosquito Control, 1984. UC Division of Ag & Natural Resources Leaflet 21398.



Resources

Local mosquito abatement districts (not all areas of the South Valley are included in mosquito abatement districts):

Kings Mosquito Abatement: 559-584-3326
Covers the northern half of Kings and a small portion of Tulare County near Waukena.

Tulare Mosquito Abatement: 559-686-6628
Covers southern Tulare County.

Delta Mosquito Abatement: 559-732-8606
Covers central and northern Tulare County.

Delano Mosquito Abatement: 661-725-3114
Covers northern Kern and parts of southern Tulare.

Kern Mosquito Abatement: 661-589-2744
Covers northern Kern and parts of southern Tulare.

The following businesses provide services for vegetation and manure solids removal. The list is not complete, nor does the University of California endorse any particular service provider.

Local vegetation management services:

Dairyman's Pest Control	559-686-4109
Experienced Gardener	559-732-1667
Green Thumb Solutions	559-280-2868
Valley Fly Control	559-625-0982

Local manure pond solids removal services:

JND Thomas	559-867-3813
Wood Bros. Inc	559-924-7715
FJ Thomas, Inc	559-212-7395
Tom Barcellos	559-730-6895
John Duarte	559-972-5537

California Dept. of Health Services:
For more information on West Nile Virus call the WNV Hotline at 800-975-4448 or visit the web site http://www.westnile.ca.gov/ You can also report dead birds at this site, or you can report dead birds on the California Dead Bird Hotline at 877-WNV-BIRD (877-968-2473).

California Dept. of Food & Agriculture:
For more information on West Nile Virus in horses, call the Equine West Nile information line 1-800-268-7378 or email WNVirus@cdfa.ca.gov or visit http://www.cdfa.ca.gov/ahfss/ah/wnv_info.htm.

Air Issues Update

Last week in California the San Joaquin Valley Air Pollution Control District announced a decision to use an emission factor of 19.3 lbs of smog forming, so-called volatile organic compounds (VOCs) per cow per year to determine the threshold dairy herd size for which air permits will be required. Air emissions from dairy cows have been hotly debated for many months as the Air District has been developing regulations for dairies to prevent "cow pollution". The Air District's decision, and the controversy surrounding it made news all around the country. In the midst of it is our own UC Cooperative Extension Air Quality Specialist, Dr. Frank Mitloehner, a scientist at UC Davis who has been conducting research on air emissions from dairy cows in carefully controlled studies. Of major concern to Mitloehner and atmospheric scientists at other leading research institutions is the Air District's inclusion of a special group of VOCs, namely volatile fatty acids (VFA) in determining the emission factor. Volatile fatty acids are natural byproducts of feed fermentation that occurs in a cow's stomach. The main problem is that there is currently no standard method developed for measuring volatile fatty acids. Preliminary findings from Mitloehner's study were provided to the Air District with a strong warning not to use the data to develop an emission factor, because of the uncertainty in the ability to measure them accurately. Nevertheless, the Air District ignored the warning and included volatile fatty acids in their VOC emission factor.

VFAs are not the enemy!

Volatile fatty acids are a good thing when it comes to dairy cows. In fact, cows, as well as sheep, goats, camels, deer and other ruminants, depend on volatile fatty acids produced from feed in their unique digestive tract to meet their nutritional requirements. Bacteria in the rumen, a part of the stomach that is a large fermentation chamber, digest the feed. These natural bacteria digest the feed by fermenting it.

The fermentation process in the rumen produces gases including volatile fatty acids (which are VOCs), carbon dioxide and methane (both are not VOCs). Some of the volatile fatty acids are absorbed from the rumen into the bloodstream and used throughout the body as energy sources. Some of the volatile fatty acids are absorbed into the bloodstream by another route. Dairy cows ruminate (which literally means to chew again) when they are resting. Rumination involves bringing up a big wad of feed from the rumen to re-chew. The related 'burping' process has a fancy name too – eructation. In the process of burping, gas is brought up with the feed and a small percentage of these gases is released through the mouth and nose. However, the majority of volatile fatty acids go from the stomach (rumen) up the esophagus, and then down the trachea and into the lungs where they are absorbed into the blood. The vast majority of volatile fatty acids are therefore either absorbed in the rumen or in the lungs to ultimately end up in the blood to provide nutrients for the cow. This process of VFA use by the cow was studied in great detail over the last 20 years in the Animal Science Department at UC Davis (Dr. Harry Colvin).

The small portion of gases that escape absorption end up in the air. These gases are among the most difficult to measure gases of all. Scientists have not yet been able to develop a standard method to provide consistent, accurate measurements. From a nutritional standpoint, it would be great if none of the volatile fatty acids escaped the cow and all could be put to efficient use in support of growth or milk production. From an air quality standpoint, the question remains - how dangerous are these volatile fatty acids that do escape? The ability of volatile fatty acids from cow breath or manure to react with other constituents in air to form ozone is very low. As potential air pollutants that form ozone, they are about as reactive as acetone, which is exempt from regulation.

So VFAs are not so scary. In fact, according to Dr. Mitloehner, most volatile organic compounds measured in California studies were detected at very low concentrations. The ones that were found in measurable amounts in dairy air studies are so low in reactivity that they hardly have any ozone-forming potential. Instead of targeting VFAs, which are so important for the health and welfare of cows, we should eagerly await summaries of completed California studies to help us focus on the most significant pollutants. Then we can more wisely direct control efforts to where they will provide the most benefit for improving air quality.

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In this Issue of Dairy Notes . . .

- ***How Dairies Can Help Fight WNV***
- ***Air Issues Update***

Newsflash!! *– All dairies in the Central Valley recently received a letter from the Regional Water Quality Control Board requesting them to submit mandatory Reports of Waste Discharge by Oct. 17, 2005. The California Dairy Quality Assurance Program and UC Cooperative Extension will be holding informational meetings throughout the region in September and October to help producers understand what is required. Stay tuned for dates and locations that will be publicized widely when they are determined.*

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Kings/Tulare Counties