May showers bring summer mosquitoes!

Mosquitoes are the third most abundant animal on the planet, outnumbered only by termites and ants. Control of these pests is a season-long battle made worse by spring rains and warming temperatures. Southeast Wyoming and western Nebraska are home to at least 45 species of five main genera: *Aedes, Anopheles, Culex, Culiseta, and Mansonia*. Other insects may be mistaken for mosquitoes including non-biting, biting and phantom midges, crane flies, and black flies.

Species in the *Culex* genus, notably *tarsalis*, are the most common around this area and transmit the West Nile virus. The genus *Aedes* includes over 400 species, about 30 of which can be found in this area. These mosquitoes can carry several diseases including Zika, dengue, yellow fever, and chikungunya. Species *aegypti* and *albopictus* have recently been in the news regarding Zika virus but these species are not found in this area. *Anopheles* species are wide-spread throughout the world and are the vector for malaria as well as heartworm in dogs. *Culiseta*, the largest of the genera, prefers cooler weather. The *Mansonia* genus is also called the cattail mosquito due to the fact the larvae breathe through the cattail stems making them difficult to find as the larvae never surface to breathe.

Mosquitoes go through complete metamorphosis during their life cycle from an egg, larva, pupa, to adult. In general, as temperatures increase the time required to complete the life cycle will decrease. The days required to develop from larva to adult can decrease from 34 to 9 for certain species with a 27 degree increase in temperature. Identifying the life cycle can help determining efficient control measures. *Culex* adult females overwinter in mild temperatures such as sewage areas and vents in homes until temperatures increase and they begin laying eggs in stagnant water. Multiple eggs are laid at once in a raft-like formation. Populations will usually peak in August to September depending on weather. *Aedes* mosquitoes are also referred to as flood-water mosquitoes as they lay eggs in damp areas which will be inundated with fresh water at some point(s) throughout the season. These mosquitoes lay single eggs which can be viable for five to ten years. These mosquitoes appear early in the season since they overwinter in egg stage and resume their life-cycle once the necessary photoperiod and temperature are reached. The *Aedes* species are domestic mosquitoes preferring human blood, living indoors near people, and biting during the day-time.

There are several sources for adult identification, including “keys” which progress through several characteristics to identify the genus. It is important to only use females, which have smaller antennae, for identification purposes as keys are not reliable for males which have feather-like antennae. *Culex* adults will have faint white bands on the proboscis, the elongated sucking mouthpart, as well as white stripes along the legs and dark chevrons on the abdomen. Typically a dark brown color, *Anopheles* adults will rest with the body at an angle to the surface rather than parallel and have dark spots on the wings. Adult *Aedes* mosquitoes have a noticeably darker body, appearing almost black, with white spots and three sets of white bands on each leg. Larvae can be distinguished by the swimming motion. When at the surface and moving downward, a *Culex* will bend in the middle to swim forming a “c” shape while an *Aedes* larva will bend in a motion similar to a slithering snake.

A great time to control mosquitoes is in the larval stage, called larviciding. A main benefit of larvicides is the ability to control many insects in a concentrated area versus waiting until mosquitoes are airborne which increases the area necessary to control. A common biocontrol agent for mosquito larvae is Bacillus thuringiensis israelensis (Bti), a microbe found in soil which contains proteins toxic to certain immature insects. The Bti active ingredient can be found in various products and formulations including granular, pellet, briquet, and liquid. Once the larvae advance to the pupae stage, control with Bti is not an option as pupae are not active feeders. One of the only control options during this life stage is by placing a film of oil on the water which prevents the pupae from being able to breathe when surfacing. When scouting for mosquito larva, a process called “dipping” is used to indicate the presence/absence, growth stage, and population by dipping a larval-dipper, or cup-like tool, into the body of water. Larvae are mobile so dips need to be taken in various locations such as around the edge, in the middle, and through plant material.

Mosquitoes are responsible for the highest number of human deaths compared to any other animal. Fortunately, most of the life-threatening transmitted diseases are not prevalent in this area though control is still essential to minimize effects from diseases such as West Nile virus which can impact humans and horses. *Culex tarsalis* is the vector for West Nile which is active in birds, transmitted by mosquitoes and dies in the mammal. It has been estimated that West Nile has cost nearly $800 million in human medical costs from 1999-2012. Another disease of increasing importance is the Zika virus, named after the forest it originated in. Zika was first found in monkeys in 1947 and mutated to affect humans with the first case documented in 1952. Even though the *Aedes* species known to transmit Zika virus are not yet in this area, information regarding the virus and potential other vectors is not well known yet. Travel is a concern with this virus as it can be transmitted from human to human, as in the case of pregnant mothers to child. *Aedes aegypti* and *albopictus* are currently found in southern states with further research being done to determine if other *Aedes* species or if *Culex* mosquitoes may carry Zika virus. The Center for Disease Control has up-to-date information regarding the virus.

The best way to control the mosquito population is by removing any breeding and egg-laying habitat, especially standing water in old tires, buckets, potted plants, and ponds at least once per week. Consider the landscape when determining the type of product to use if larviciding. For example, if standing water areas are segregated, as around a water tank with hoof prints, a granular formulation would be more effective than pellets. Read and follow label directions on larvicide products for application timing and amount. Always remember to drain, dress, and defend. For more information, contact your local weed and pest control office or Goshen County Weed and Pest at: (307) 532-3713, gocoweeds@embarqmail.com, or <https://www.facebook.com/gocoweeds>.