Utah Department of Health and Human Services

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Tick surveillance annual report 2024

Introduction

The Utah Department of Health and Human Services (DHHS) conducts tick surveillance to better understand:

- where ticks are located in Utah.
- when ticks are active.
- which diseases ticks in Utah carry.

All these data help identify areas of risk for certain tickborne diseases across the state.

The tick surveillance project began in summer 2020. The Utah Public Health Lab (UPHL) began identifying ticks in summer 2022. Along with Utah DHHS and UPHL, these efforts have been conducted with help from the following partners:

- local health departments (LHDs) throughout Utah
- Division of Wildlife Resources (DWR)
- the Rickettsial Zoonoses Branch at the Centers for Disease Control and Prevention (CDC)
- various camp facilities throughout the state
- residents of Utah who submit tick specimens to UPHL

This annual report summarizes tick surveillance efforts during the 2024 season and includes:

- locations where tick drag events occurred.
- which types of ticks were found.
- which diseases ticks carried (if any).
- tick surveillance expansion and improvement efforts.

Dermacentor andersoni female under the microscope at UPHL.

Background

Tickborne disease incidence in people in Utah is low. The most common disease carried by ticks in Utah is Colorado tick fever (CTF), followed by Rocky Mountain Spotted Fever (RMSF). On average, 1–2 CTF cases are reported annually and an average of 1 RMSF case is reported every 5 years in the state. Both diseases can be transmitted by *Dermacentor andersoni* (Rocky Mountain wood tick), which is the most common tick found in Utah.

Lyme disease is the most common tickborne illness in Utah. However, most human Lyme disease cases reported in Utah had traveled to Lyme-endemic areas in the midwest and along the east coast. There is no current evidence of tickborne Lyme disease transmission in Utah. The vector for Lyme disease is *Ixodes pacificus* (western black-legged tick). *Ixodes pacificus* is native to Utah, but none of the ticks tested have tested positive for the bacteria that causes Lyme disease. However, a handful of Lyme disease cases have been reported to Utah DHHS with no out-of-state travel history. Therefore, further investigation on Lyme disease risk in Utah is needed.

Tick surveillance efforts help to understand more about Lyme disease in Utah. Additional goals of tick surveillance include:

- to identify which tick species are present in each Utah county.
- what diseases they carry.
- when tick species are active.

Utah's tick surveillance efforts have expanded to include:

- tick drags performed by LHDs.
- animal surveillance performed by representatives at DWR and practicing veterinarians.
- passive surveillance by volunteer partners.
- public submissions through a citizen submission program.

Surveillance protocols

The tick surveillance program at Utah DHHS is always changing and improving. We adapt our procedures each year based on the goals and objectives for the current season. For information about the 2022 and 2023 programs and their protocols, see our previous reports at epi.utah.gov/tickborne-diseases/. Below are the specific surveillance protocols we used during the 2024 tick season.

Student internship program

Utah DHHS partnered with Colorado State University (CSU) and RaHP VEC (Rocky and High Plains Vector Center) in 2024 to start a tick surveillance internship. This internship was funded by RaHP VEC with the following goals:

- assist the One Health team in tick surveillance field work
- expand the Utah tick surveillance program
- mentor and educate students and post-graduates interested in public health and vector surveillance

During the first year of this internship, Utah DHHS and CSU hired 2 paid interns. The interns helped conduct most of the 2024 tick drags across the state, identified many of the ticks that were collected, and helped create tick educational materials for the public and other partners.

DHHS tick drags

The spring tick drag schedule depends on the temperature and snow melt. This means the start dates change every year. Once temperatures are above freezing for a week and there is no snow on the ground at a specific site of interest, the spring tick drags can begin.

Two to 5 Utah DHHS employees visit a drag site and, using a tick flag (a white cloth with the broom stick attached as a handle), walk for 30-minute periods to try to collect any ticks in the area. They check the flags every 25–30 steps to make sure any captured ticks do not fall off the cloth. They collect the ticks from the flag and place them in labeled tubes. The ticks are then sent to UPHL to be analyzed further. The tick drag season ends once temperatures drop below freezing for more than 3 consecutive days (usually in mid to late October).

LHD tick drags

Utah DHHS started training interested LHDs about tick surveillance and how to collect them by doing tick drags in the fall of 2022. They were also given the necessary supplies. LHD tick drags are done the same way as Utah DHHS tick drags. **One LHD helped DHHS by doing tick drags in their local area in 2024.**

Citizen submission program

The Utah DHHS citizen tick submission program began in 2023. The program encourages Utah residents to send in ticks they find. The goals of this program are to:

- diversify tick collection by obtaining a wider variety of tick species.
- expand geographic coverage by collecting ticks from more locations across Utah.
- increase overall numbers by gathering a larger sample size of ticks.
- support targeted surveillance by using information about submitted ticks (especially species of interest or those carrying pathogens) to help Utah DHHS plan more focused tick collection efforts (called tick drags) in the area where ticks or pathogens of interest were originally found.

Utah DHHS created a RedCAP survey (https://pubredcap.health.utah.gov/surveys/?s=4P9WXFRWT9D9LAXL) that is posted on the website for anyone to fill out and submit with a tick specimen. If the person includes their email address on the form, Utah DHHS will let them know what kind of tick it was. Pathogen testing results are for internal use only and are not shared with the submitter since tick pathogen results should not be used to diagnose human illnesses.

Tick identification protocol

Ticks are visually identified using a microscope and reference guides called dichotomous keys (Brinton et al., 1965), which were provided by the Rickettsial Zoonoses Branch at the CDC. If a tick is in its larval stage or is damaged and cannot be clearly identified under the microscope, a process called sequencing is used to determine the species.

Tick pathogen testing protocol

Utah Public Health Laboratory (UPHL) tests all undamaged and intact adult ticks for pathogens (disease-causing organisms) of interest. Currently, UPHL tests for 3 specific pathogens: *Rickettsia rickettsii* (the bacteria that causes Rocky Mountain Spotted Fever), Colorado Tick Fever virus (CTFv), and *Borrelia burgdorferi* (the bacteria that causes Lyme disease). Which tests are performed depends on the type of tick that is submitted for testing.

Utah DHHS tick drag locations summary

The main goals for tick surveillance in 2024 were to increase the number of *Ixodes pacificus* and *Dermacentor similis* (American dog tick found west of the Rocky Mountains) collected in Utah. Utah DHHS tick drags were mostly done in places where these species of interest had been previously found by our team or reported by the public. We also conducted tick drags in neighboring counties to better understand the geographic range of the tick species of interest. Utah DHHS performed 55 tick drags at 46 different locations throughout the 2024 season.

The first tick drags of the year took place on March 22, 2024, in San Juan County (earlier than the May 4 start in 2023), and continued until July 25, 2024, in Box Elder County, at which point very few ticks were being collected due to the high summer temperature. We did not do any tick drags in August or September of 2024. We conducted a final tick drag in southwest Utah on October 31, 2024, to collect more *Ixodes pacificus* for pathogen testing. Table 1 summarizes the tick drags completed during 2024 by county.

Table 1. Tick drag events by county, 2024

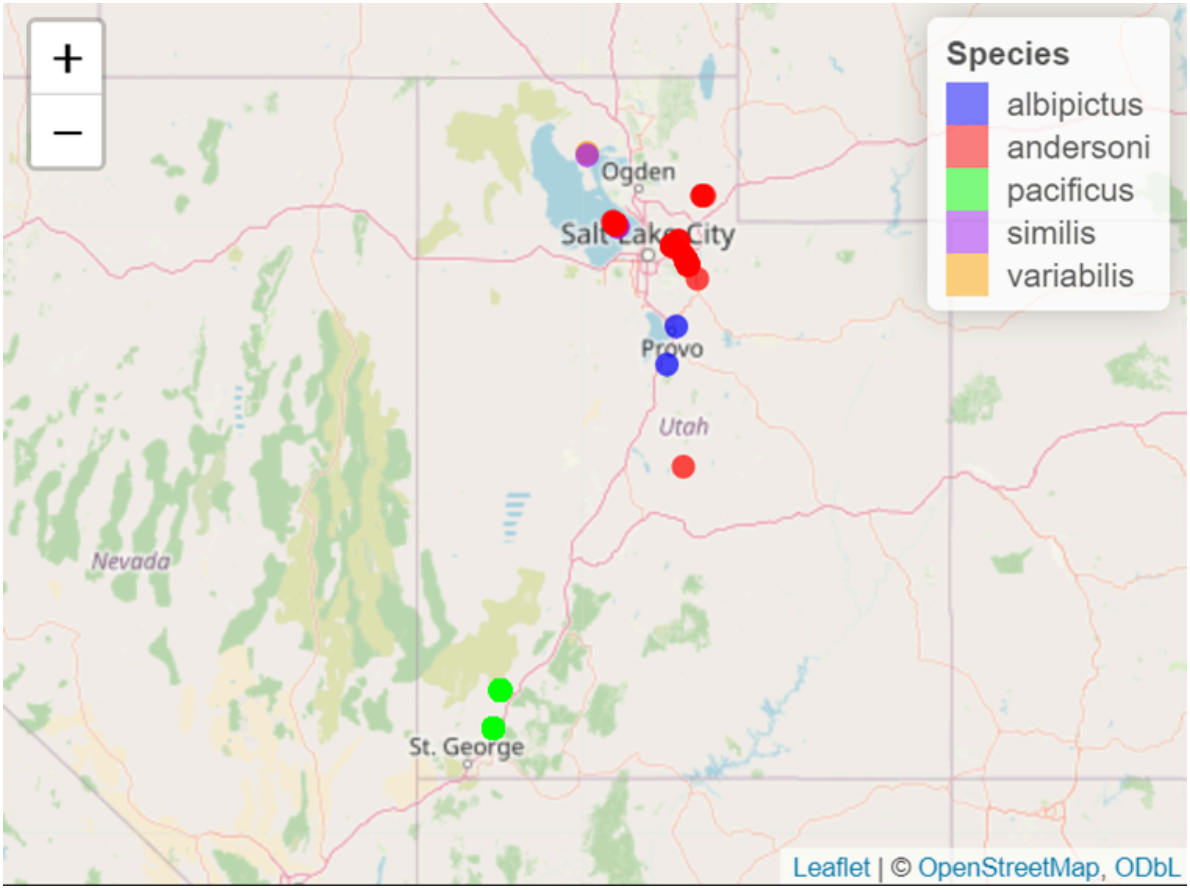
County	Number of tick drags
Box Elder	7
Davis	11
Iron	4
Juab	2
Millard	2
Morgan	3
San Juan	1
Sanpete	3
Summit	4
Utah	2
Wasatch	3
Washington	6
Weber	6
Total	**55**

Tick specimen summary

We collected **147 adults, 1 nymph, and 123 larvae in 2024** (Table 2). For comparison, we collected 229 adults, 2 nymphs, 128 larval ticks, and more than 100 tick eggs in 2023. Ticks collected in 2024 came from Utah DHHS tick drags and passive collection through the Utah DHHS public submission program. Figure 1 shows the locations where adults, nymphs, and larvae were collected throughout Utah in 2024. The species indicated in figure 1 include:

- *Dermacentor albipictus* (blue)
- *Dermacentor andersoni* (red)
- *Ixodes pacificus* (green)
- *Dermacentor similis* (purple)
- *Dermacentor variabilis* (orange)

Figure 1. Ticks collected by species, 2024



Click here for an interactive tick surveillance map

Out of the 147 adult ticks collected in 2024, 78 (53%) were female (see table 2). In 2024, Utah DHHS identified 4 species among the adult ticks collected: *Dermacentor andersoni* (Rocky Mountain wood tick), *Dermacentor albipictus* (winter tick), *Dermacentor similis* (American dog tick found west of the Rocky Mountains), and *Ixodes pacificus* (western black-legged tick). We identified another tick species, *Dermacentor variabilis* (American dog tick found east of the Rocky Mountains), through microscopy. However, since *Dermacentor variabilis* has not been previously reported in Utah, DNA sequencing tests are being done to confirm its presence. Results are pending. The larval (young) ticks collected were identified as *Dermacentor albipictus* and *Amblyomma* species, and 2 larvae are pending identification. Table 3 shows how many of each type and life stage of tick were found in 2024.

Table 2. Collected adult ticks by sex, 2024

Sex	Tick count
Male	69
Female	78
Total	147

Note: Sex was not determined for larval and nymph ticks.

Table 3. Tick species counts by life stage, 2024

Species	Life stage			
	Adult	Nymph	Larvae	Total
Dermacentor albipictus	1		120	121
Dermacentor andersoni	109			110
Dermacentor similis	3			3
Dermacentor variabilis	2			2
Ixodes pacificus	32			2
***Amblyomma* species**			1	1
Unknown		1	2	3
Total	147	1	123	**272**

Note: The Amblyomma *tick was submitted through the citizen submission program by a Utah resident but came from outside of Utah. The 2* Dermacentor variabilis *ticks are still pending sequencing results to confirm identity.*

Tick habitat

Ticks collected during Utah DHHS tick drags were found in areas with mixed grasses and shrubs (Figures 2–4). All *Ixodes pacificus* ticks were found in Washington and Iron counties in areas with tall grasses, scrub oak, and leaf litter (decaying leaves on the ground). Habitat details for most citizen submitted ticks are not available.

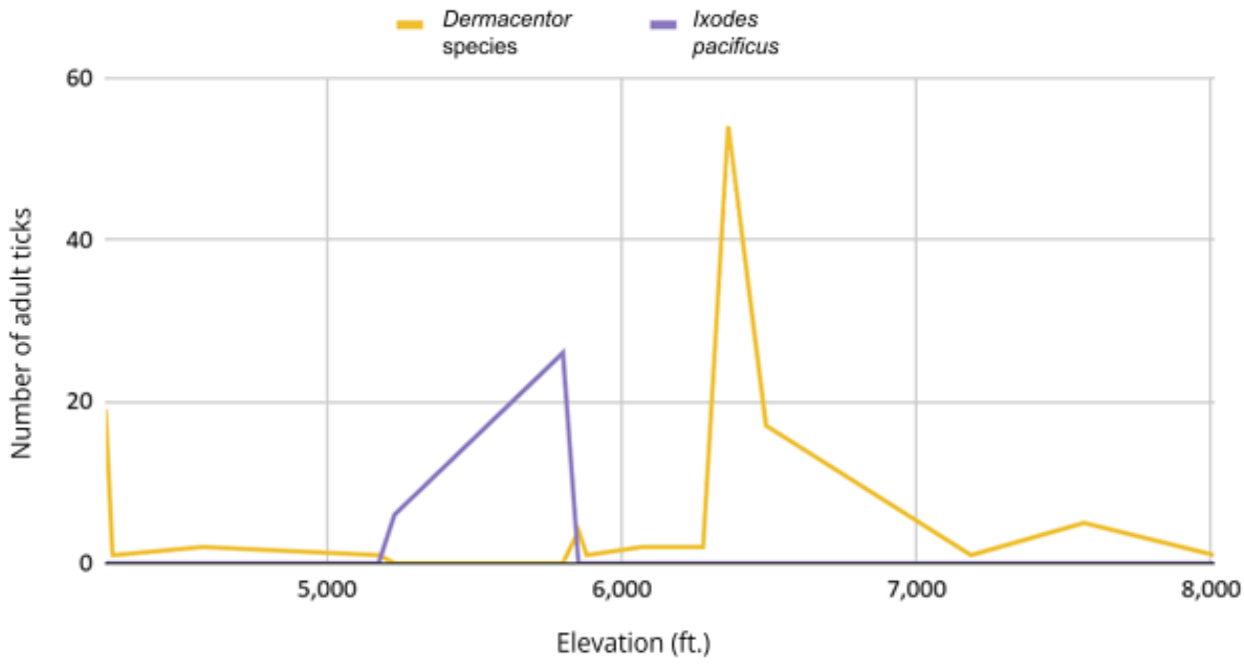
Figure 2. Sage brush and mixed green grass habitat where *Dermacentor andersoni* adults were found in the spring months

Figure 3. Habitat in Southwest Utah where *Ixodes pacificus* was collected

Figure 4. Close up of vegetation and leaf litter where *Ixodes pacificus* were found

The ticks collected in 2024 were found at elevations ranging between 4,249 feet and 8,011 feet. Figure 5 shows the elevation distribution of *Dermacentor* species (*Dermacentor andersoni, Dermacentor albipictus, Dermacentor similis, and Dermacentor variabilis*) and *Ixodes pacificus* collected during the 2024 season. More tick collections are needed to better understand which elevations different tick species prefer.

Figure 5. Elevation range of adult ticks collected in 2024



Note: Figure 5 shows the elevation range of the sites where Utah DHHS tick drags were done, as well as where passive surveillance partners collected ticks. It is important to note that this figure indicates where ticks were found, not necessarily the elevations that different tick species prefer.

Seasonality of ticks

In general, ticks are most active in the spring and early summer months after the snow melts and in the fall months once the weather cools down, before the first snow. In 2024, ticks were first collected mid-April during tick drags in southern Utah where temperatures are warmer. The number of ticks collected from tick drags peaked in late May. Tick drags were halted at the start of July due to low tick numbers and hot summer temperatures. *Ixodes pacificus* ticks were also collected in late October during the final tick drag of the season. Table 4 provides a monthly breakdown by county of where adult *Dermacentor* and *Ixodes* ticks were found in 2024.

Table 4. Location of ticks collected by month per county

County	Month					
	April	May	June	July	October	Grand total
Box Elder				**2**		**2**
Dermacentor species				2		
Ixodes species						
Davis	**15**	**3**	**4**			**22**
Dermacentor species	15	3	4			
Ixodes species						
Iron	**11**		**2**		**13**	**26**
Dermacentor species						
Ixodes species	11		2		13	
Morgan			**11**			**11**
Dermacentor species			11			
Ixodes species						
Sanpete		**1**	**1**			**2**
Dermacentor species		1	1			
Ixodes species						
Summit	**22**	**51**		**1**		**74**
Dermacentor species		51		1		
Ixodes species						
Utah	**1**			**1**		**2**
Dermacentor species	1			1		
Ixodes species						
Wasatch	**1**		**1**			**2**
Dermacentor species	1		1			
Ixodes species						
Washington	**5**				**1**	**6**
Dermacentor species						
Ixodes species	5				1	
Grand total	**55**	**55**	**19**	**4**	**14**	**147**

Notes:
Tick drags were not conducted in August and September.
Dermacentor species = *D. andersoni*, *D. albipictus*, *D. similis*, and *D. variabilis*
Blank cells either represent no ticks collected and submitted that month OR tick drags were not conducted that month, and no submissions were received.

Figure 6 compares the number of ticks found by month for 2022, 2023, and 2024.

Figure 6. Ticks collected by month, 2022–2024

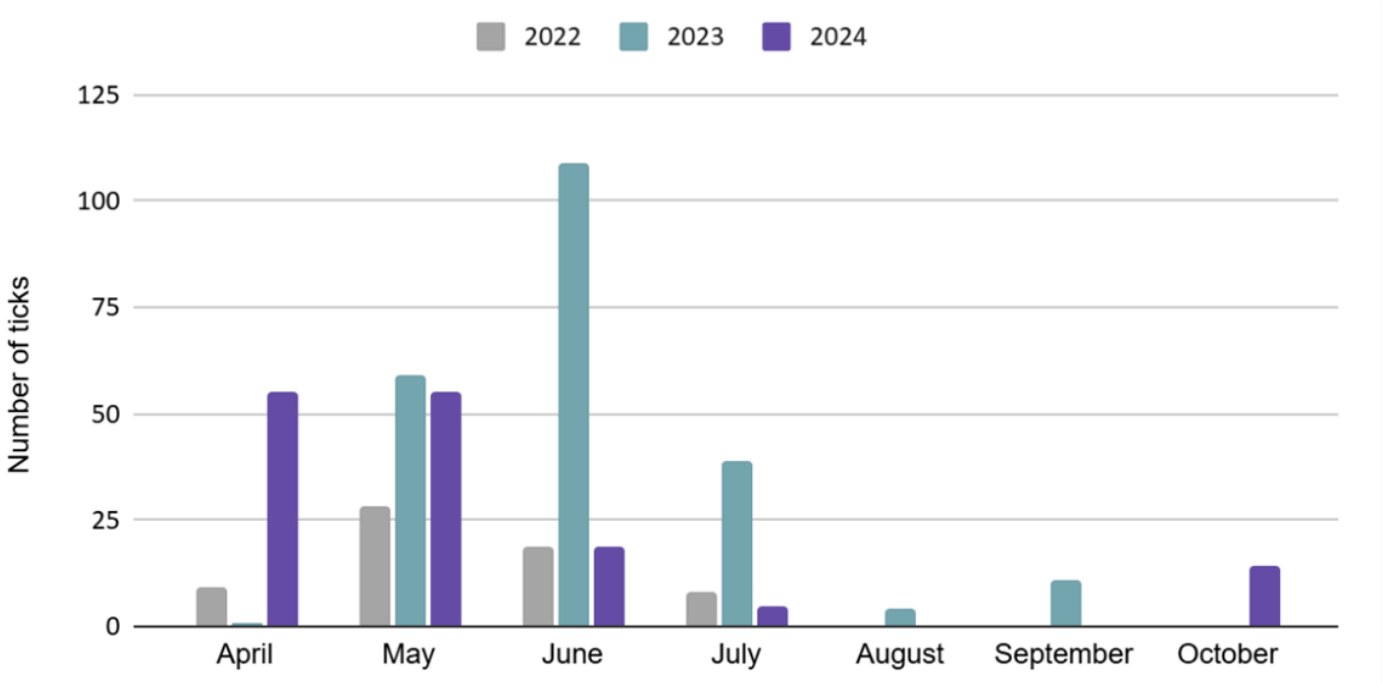
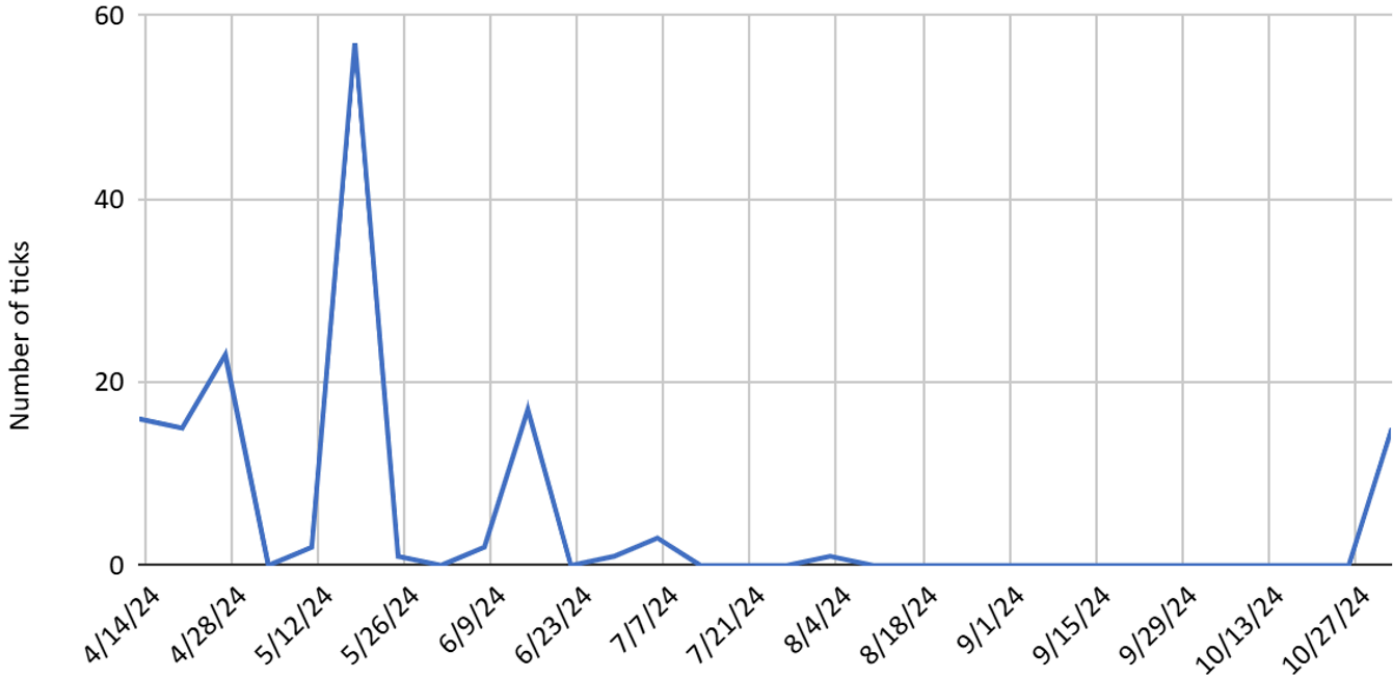


Figure 7 shows the number of ticks from all life stages found by all methods every 2 weeks. Larvae found on the same date are counted as 1 tick, rather than individual larvae counts.

Figure 7. Tick collection counts—biweekly, 2024



Pathogen testing

Pathogens are organisms (such as viruses or bacteria) that cause disease. In 2024, UPHL was able to to test tick samples for 3 pathogens: Colorado tick fever virus (CTFv), *Rickettsia rickettsii* (which causes Rocky Mountain Spotted Fever), and *Borrelia burgdorferi* (which causes Lyme disease). As of May 2025, UPHL has tested 124 out of the 147 adult and nymph ticks collected throughout 2024. *Dermacentor* ticks were tested for *R. rickettsii* and CTFv. *Ixodes pacificus* ticks were tested for *Borrelia burgdorferi.* Ninety-two ticks were tested for *Rickettsia rickettsii* and CTFv, and 32 *Ixodes pacificus* ticks were tested for *Borrelia burgdorferi*. Table 5 summarizes the pathogen testing results.

Table 5. Pathogen testing results from 2024 collected ticks

Pathogen tested	# Positive	# Negative
Rickettsia rickettsii	0 (0%)	92 (100%)
Colorado tick fever virus	4 (4.3%)	88 (95.7%)
Borrelia burgdorferi	0 (0%)	32 (100%)

Tickborne disease counts

The most common tickborne diseases that are reportable in Utah include Colorado tick fever (CTF), Lyme disease, Rocky Mountain spotted fever (RMSF), and Tickborne relapsing fever (TBRF).

Confirmed or probable human cases of tickborne diseases in 2024:

- Colorado tick fever (CTF): 0
- Lyme disease: 19
    - 14 cases had traveled out of state
    - 3 cases had unknown travel and exposure history
    - 2 cases reported no travel outside of Utah during the time they were likely exposed
- Rocky Mountain spotted fever (RMSF): 2
    - 1 case reported no travel outside of Utah
- Tickborne relapsing fever (TBRF): 0

Table 6 shows a summary of these case numbers compared to the average number of cases over the past 5 and 10 years.

Table 6. 2024 human tickborne disease case counts vs. 5- and 10-year averages

Disease	2024	5-year average	10-year average
Colorado tick fever	0	1.8	0.9
Lyme disease	19	16	16.6
Rocky Mountain spotted fever	2	2.2	4.8
Tickborne relapsing fever	0	0.4	0.6

Resources

Utah pest fact sheet: Ticks and tickborne diseases of Utah (Utah State University)

Lyme disease DHHS disease plan (2022)

Colorado Tick Fever DHHS disease plan (2018)

Spotted fever rickettsiosis DHHS disease plan (2019)

CDC tick surveillance and tick drag protocol (2020)

CDC tick website

CDC tickborne disease reference manual for providers (Sixth Edition, 2022)

BYU *Dermacentor* identification Dichotomous keys