

2017 Vermont Survey for Tick-Borne Diseases

Vermont Agency of Agriculture, Food & Markets

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16 February 2018

In 2017, the Vermont Agency of Agriculture, Food & Markets (VAAFM) did a statewide survey for ticks in the spring and fall and tested for 5 tick-borne pathogens: *Borrelia burgdorferi*, *Anaplasma phagocytophilum*, *Babesia microti*, *Borrelia miyamotoi*, and deer tick virus (a variant of Powassan virus). A total of 95 towns were surveyed, representing towns from 13 of Vermont's 14 counties (towns in Grand Isle county were not surveyed in 2017). A single site in each town was chosen by selecting a road from the Vermont Delorme Atlas and then going to that road to look for suitable habitat for ticks. We looked for areas with a field edge, next to a stone wall, adjacent to a forest, or a combination of these characteristics. Four transects of 100 meters each were established and then surveyed for ticks every 10 meters with a 1-m² white flannel tick flag gently waved on the ground in front of the surveyor. Ticks were removed from the flag at each 10-meter interval and preserved in vials containing 95% ethyl alcohol. The ticks from the survey were identified to species at the VAAFM laboratory in Berlin and placed individually in vials for molecular testing for diseases. The VAAFM laboratory in Burlington did the testing using RT-PCR testing. The laboratory tested 545 blacklegged (deer) ticks collected during the 2017 season.

A total of 606 ticks were collected: 545 blacklegged ticks and 61 dog ticks. The total amount of ticks per town ranged from 0 to 76, with an average of 6 ticks per town.

Table 1. Results of 2017 Tick Testing in Vermont

	Pathogens Found	# of Ticks	% Infected
Bo	<i>Borrelia burgdorferi</i>	251	46.01%
An	<i>Anaplasma phagocytophilum</i>	54	9.91%
Ba	<i>Babesia microti</i>	34	6.24%
Bm	<i>Borrelia miyamotoi</i>	3	0.55%
DTV	Deer Tick Virus	0	0%

Table 2. Coinfection Rates of Ticks Tested in 2017 (ticks that tested positive for more than one virus)

Co-Infections	# of Ticks	% Infected
Bo-An-Ba	20	3.67%
Bo-An	17	3.12%
An-Ba	10	1.83%
Bo-Ba	2	0.37%
Bo-Bm	2	0.37%

Table 3. Vermont Town Tick Totals (total number of blacklegged ticks and dog ticks per 400 m²)

Town	County	# Ticks Collected
Bethel	Windsor	0
Calais	Washington	5
Canaan	Essex	2
Cavendish	Windsor	15
Chester	Windsor	2
Craftsbury	Orleans	0
Derby	Orleans	0
East Montpelier	Washington	2
Fairlee	Orange	12
Ferdinand	Essex	0
Fletcher	Franklin	0
Georgia	Franklin	5
Glover	Orleans	0
Granby	Essex	0
Greensboro	Orleans	1
Guildhall	Essex	3
Halifax	Windham	1
Hancock	Addison	0
Highgate	Franklin	1
Holland	Orleans	0
Hubbardton	Rutland	0
Huntington	Chittenden	0
Ira	Rutland	3
Irasburg	Orleans	0
Leicester	Addison	22
Lemington	Essex	0
Lincoln	Addison	0
Londonderry	Windham	1
Lowell	Orleans	0
Ludlow	Windsor	5
Lunenburg	Essex	0
Lyndon	Caledonia	6
Maidstone	Essex	1
Marshfield	Washington	3
Mendon	Rutland	3
Middlebury	Addison	12
Middlesex	Washington	6
Middletown Springs	Rutland	4
Monkton	Addison	18
Montgomery	Franklin	4
Montpelier	Washington	1
Moretown	Washington	0
Morgan	Orleans	0
Morristown	Lamoille	0
Mount Holly	Rutland	1
Mt Tabor	Rutland	32
New Haven	Addison	14
Newark	Caledonia	4

Town	County	# Ticks Collected
Newbury	Orange	18
Newfane	Windham	39
Northfield	Washington	0
Norwich	Windsor	9
Orwell	Addison	3
Panton	Addison	0
Pawlet	Rutland	20
Peacham	Caledonia	5
Pittsfield	Rutland	5
Pittsford	Rutland	0
Plainfield	Washington	0
Plymouth	Windsor	1
Poultney	Rutland	35
Pownal	Bennington	12
Proctor	Rutland	8
Putney	Windham	8
Randolph	Orange	2
Richford	Franklin	0
Richmond	Chittenden	11
Ripton	Addison	0
Royalton	Windsor	26
Rutland City	Rutland	32
Rutland Town	Rutland	22
Ryegate	Caledonia	11
Sandgate	Bennington	16
Searsburg	Bennington	2
Sharon	Windsor	3
Sheffield	Caledonia	0
Shelburne	Chittenden	1
Somerset	Windham	0
South Burlington	Chittenden	2
St. George	Chittenden	3
St. Johnsbury	Caledonia	9
Stamford	Bennington	7
Stannard	Caledonia	0
Stowe	Lamoille	0
Strafford	Orange	3
Stratton	Windham	0
Sunderland	Bennington	8
Thetford	Orange	76
Topsham	Orange	1
Townshend	Windham	15
Tunbridge	Orange	2
Vernon	Windham	2
Waterville	Lamoille	3
Winhall	Bennington	1
Wolcott	Lamoille	0

This map displays the distribution of *Borrelia burgdorferi* across Vermont's counties. The legend indicates two types of data points:

- *Borrelia burgdorferi*
- Tick Survey Spring 2017
- Tick Survey Fall 2017

The map shows various towns labeled, including Highgate, Georgia, Waterville, St. George, Richmond, Monkton, New Haven, Middlebury, Leicester, Orwell, Pittsfield, Royalton, Sharon, Thetford, Norwich, Proctor, Mendon, Rutland City, Rutland Town, Poulney, Middletown Springs, Pawlet, Mt Tabor, Ludlow, Cavendish, Sandgate, Bennington, Windham, Putney, Searsburg, Halifax, Pownal, Stamford, Tunbridge, Fairlee, Ryegate, Newbury, St. Johnsbury, and Montpelier. Counties shown include Franklin, Orleans, Essex, Lamoille, Chittenden, Caledonia, Washington, Addison, Orange, Windsor, Rutland, Bennington, and Windham.

Figure 2. Vermont Collection Sites Positive for *Anaplasma phagocytophilum* (Anaplasmosis)

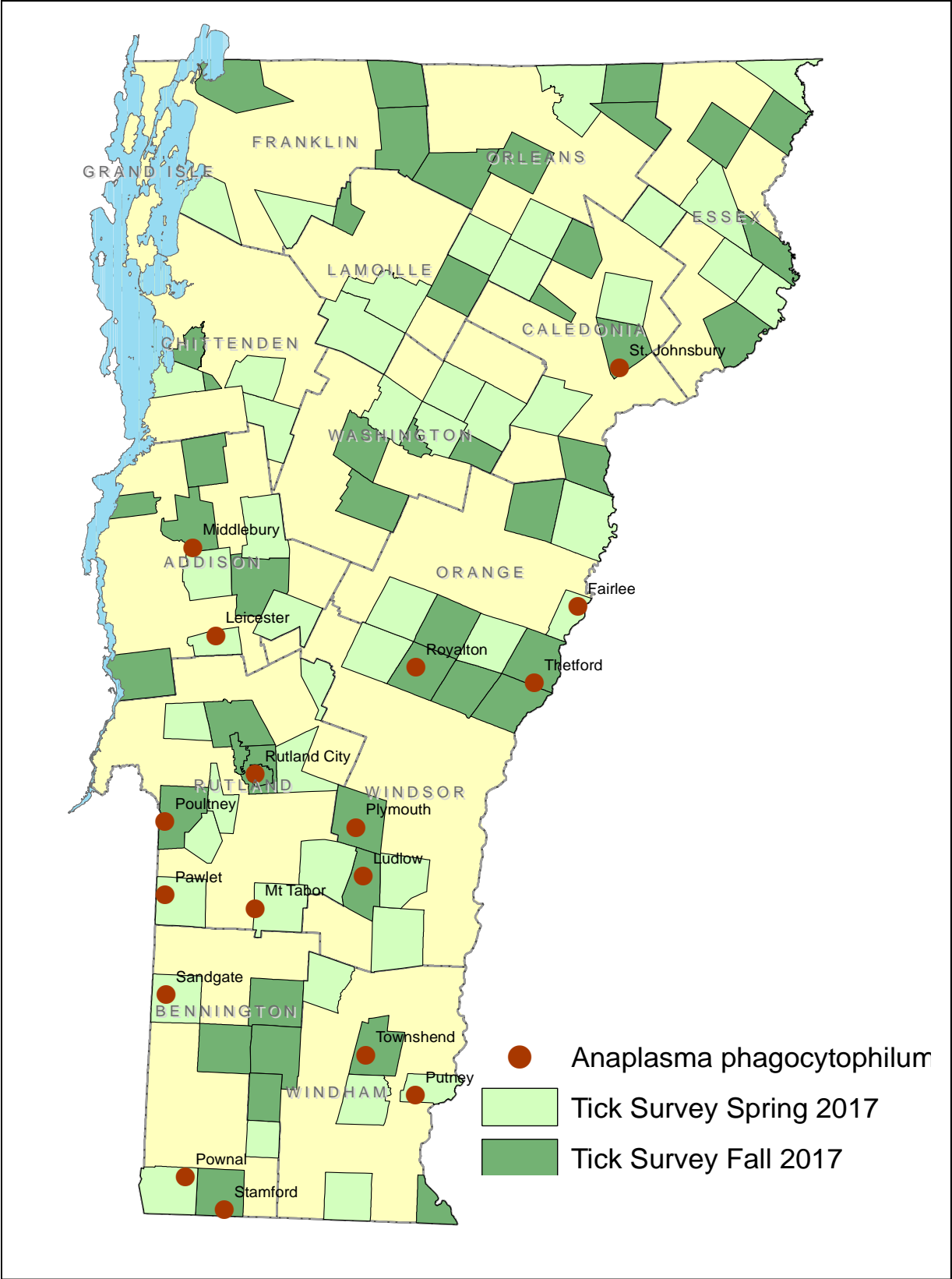


Figure 3. Vermont Collection Sites Positive for *Babesia microti* (Babesiosis)

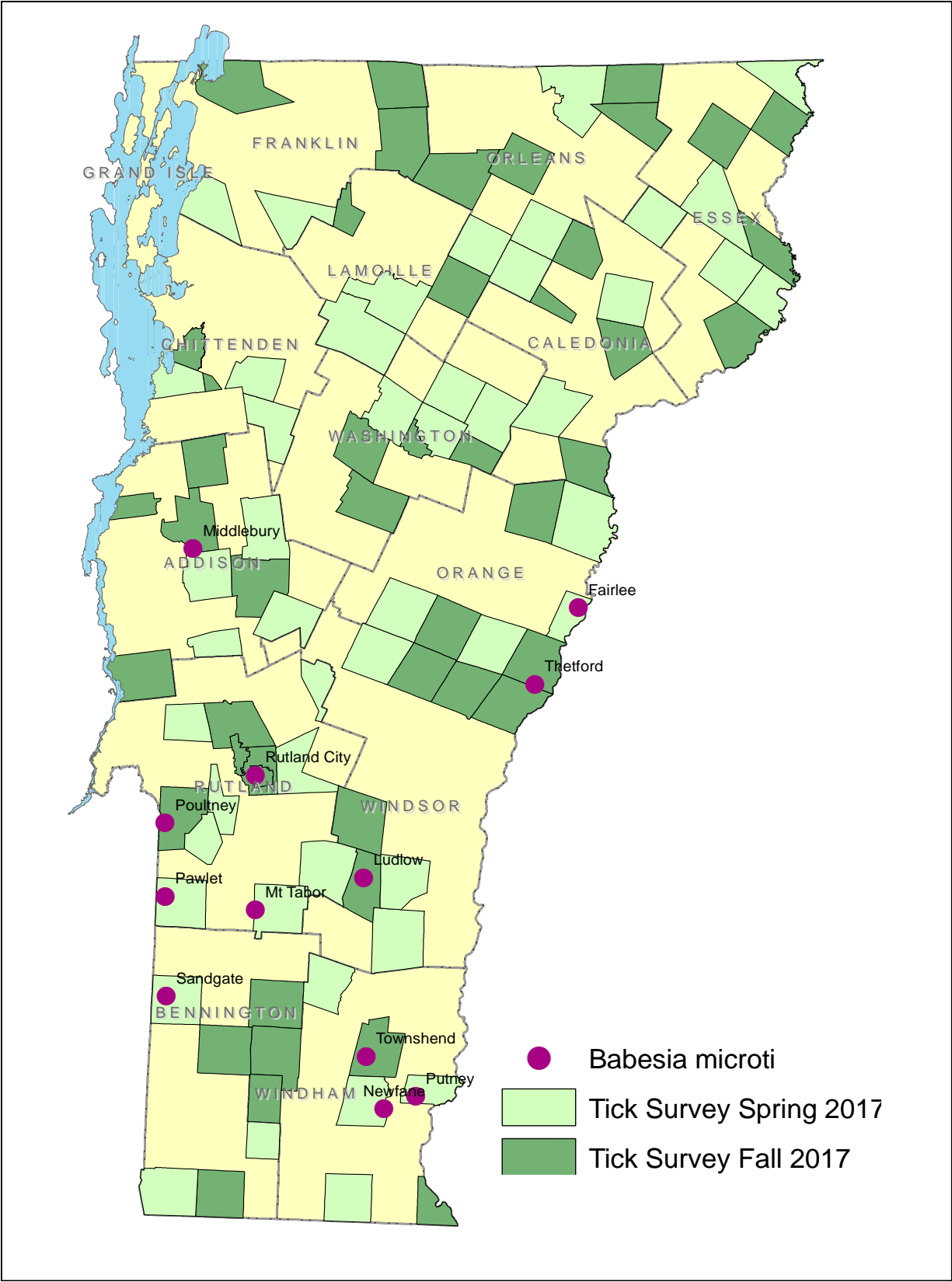
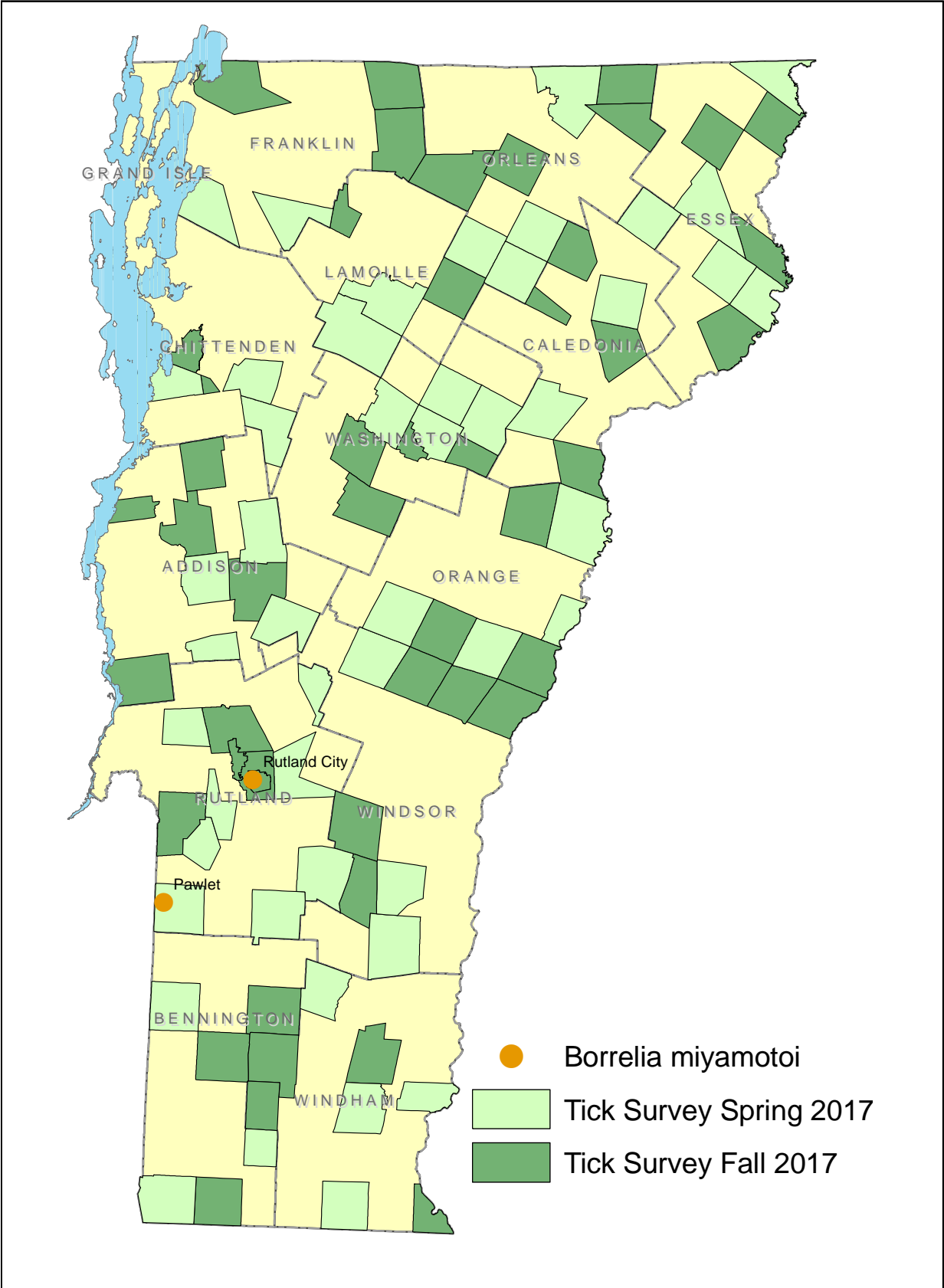


Figure 4. Vermont Collection Sites Positive for *Borrelia miyamotoi*



Maidstone	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0
Marshfield									
Mendon	2	66.67%	0	0.00%	0	0.00%	0	0.00%	0
Middlebury	5	41.67%	2	16.67%	2	16.67%	0	0.00%	0
Middlesex	4	66.67%	0	0.00%	0	0.00%	0	0.00%	0
Middletown Springs	2	50.00%	0	0.00%	0	0.00%	0	0.00%	0
Monkton	12	66.67%	0	0.00%	0	0.00%	0	0.00%	0
Montgomery	1	25.00%	0	0.00%	0	0.00%	0	0.00%	0
Montpelier	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0
Moretown									
Morgan									
Morristown									
Mount Holly	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0
Mount Tabor	12	37.50%	8	25.00%	8	25.00%	0	0.00%	0
New Haven	6	42.86%	0	0.00%	0	0.00%	0	0.00%	0
Newark									
Newbury	7	53.85%	0	0.00%	0	0.00%	0	0.00%	0
Newfane	13	68.42%	0	0.00%	3	15.79%	0	0.00%	0
Northfield									
Norwich	4	44.44%	0	0.00%	0	0.00%	0	0.00%	0
Orwell	2	66.67%	0	0.00%	0	0.00%	0	0.00%	0
Panton									
Pawlet	11	55.00%	6	30.00%	6	30.00%	1	5.00%	0
Peacham									
Pittsfield	1	20.00%	0	0.00%	0	0.00%	0	0.00%	0
Pittsford									
Plainfield									
Plymouth	0	0.00%	1	100.00%	0	0.00%	0	0.00%	0
Poultney	10	30.30%	3	9.09%	3	9.09%	0	0.00%	0
Pownal	6	54.55%	1	9.09%	0	0.00%	0	0.00%	0
Proctor	2	25.00%	0	0.00%	0	0.00%	0	0.00%	0
Putney	1	12.50%	1	12.50%	1	12.50%	0	0.00%	0
Randolph	0	0.00%	0	0.00%	0	0.00%	0	0.00%	0
Richford									
Richmond	5	45.45%	0	0.00%	0	0.00%	0	0.00%	0
Ripton									
Royalton	7	26.92%	3	11.54%	0	0.00%	0	0.00%	0
Rutland	18	51.43%	4	11.43%	1	2.86%	2	5.71%	0
Rutland Town	13	54.17%	0	0.00%	0	0.00%	0	0.00%	0
Ryegate	6	54.55%	0	0.00%	0	0.00%	0	0.00%	0

