Tick pools were prepared from the over 2000 ticks collected and graciously donated.

**INTRODUCTION:**

The Powassan/Deer Tick virus (POWV/DTV) is closely related to tick-borne encephalitis virus (TBEV), a viral infection in Europe causing severe neurologic disease in 20-30% of infected patients. The studies described here reveal the prevalence and geographic distribution of Wisconsin ticks carrying POWV/DTV, and the rate of infection with Borrelia, the causative agent of Lyme disease.

**METHODS:**

- Harvest 1 results were run on agarose gels for visual confirmation and RT-PCR for POW/DTV was performed.
- Nucleic acid was extracted and PCR was performed to assess each pool for Borrelia and POW/DTV.
- Harvest 2 Tick Distribution:
  - 10 ticks collected from the same dog
  - Collected within a 2 week span in Fall of 2013

**RESULTS:**

- **HARVEST 1:**
  - Collection area same as described by Ebel et al., 1999: NW quadrant of Wisconsin
  - Historically highest density of louse ticks carrying Borrelia
  - Also highest reported frequency for Lyme Disease

- **Prevalence of Tick-Associated Infectious Agents by Species in Northern Wisconsin**

- **HARVEST 2:**
  - 334 counties across Wisconsin
  - >2000 ticks collected during Spring 2014 harvest
  - Ticks used to survey prevalence of agents across Wisconsin

- **Prevalence of Borrelia and POW/DTV by Tick Genus Across Wisconsin**

- **HARVEST 3:**
  - Bayfield County in NW quadrant of Wisconsin
  - 100 ticks collected from the same dog
  - Collected within a 2 week span in Fall of 2013

**CONCLUSIONS:**

1. Both louse and Dermacentor ticks infected with Borrelia are found across Wisconsin
2. POW/DTV infection seen only in louse ticks; distribution across Wisconsin
3. An individual can acquire multiple tick-associated pathogens simultaneously.
   - Study 1: A single tick carrying more than one agent
   - Study 2: Multiple ticks carrying one agent in a single exposure
   - Study 3: Localized “hot spots” with high frequency of both single agent and co-infected ticks
4. POW/DTV found in a significant percentage of louse ticks in all studies

**Infection with POW/DTV may be under-diagnosed and the virus may contribute to the acute and/or persistent symptoms often associated with Lyme disease diagnosis.**