

The *Culex pipiens* Complex in the USA - Harry Savage

- 1) Why the interest? Primary WNV & SLE vectors
- 2) Complex
 - a) *Culex pipiens quinquefasciatus*
 - i) Does not diapause
 - ii) Southern house mosquito
 - b) *Culex pipiens pipiens* form *pipiens*
 - i) Physiological diapause
 - (1) Enter a hibernaculum
 - (2) Do not blood feed overwinter
 - ii) Northern house mosquito
 - iii) Anautogenous
 - iv) Mate in swarms in open areas
 - c) *Cx pipiens pipiens* form *molestus*
 - i) Does not diapause
 - ii) Overwinters underground
 - iii) Autogenous
 - iv) Stenogamous - mate in tight places
 - d) *Pipiens-quinqs* hybrids
- 3) Separating taxa
 - a) "Old school"
 - i) Barr 1957
 - ii) DV/D ratio (male genitalia)
 - b) HotACE.2 assay
 - i) Aspen & Savage, 2003
 - ii) Savage et al, 2007
 - c) Microsatellites
 - i) Evolve rapidly
 - ii) Highly variable
 - iii) Repeating units of 1-6 nucleotides
 - iv) Allows for characterization of individual specimens
 - d) Study
 - i) Collected mosquitoes along a transect
 - (1) Mississippi River Basin
 - (2) From New Orleans to Wisconsin
 - ii) Structure analysis to analyze data
 - (1) Cluster membership for individual specimens
 - (2) Data collected from 14 sites
 - iii) Kothera et al, 2009
 - e) Hybrid zone
 - i) Very broad
 - ii) Extends further south than originally believed
 - iii) Area where 10-20% of specimens are hybrids, depending on analysis used
- 4) Populations of form *molestus* in the USA
 - a) Where are they found?
 - i) Boston - Speilman, 1957

- ii) Also found in Chicago and a few other sites
- iii) Primarily confined to northern urban areas
- iv) Old infrastructure sites are good sites, but this is variable
- b) Where did they come from?
 - i) Europe?
 - (1) Both forms came over separately from Europe
 - (2) Populations in different sites would be similar, which is not true
 - ii) Originate from above ground populations of form *pipiens*
 - (1) Populations at different sites are very different
 - (2) Likely evolved separately from above ground populations
- 5) Bloodmeal study
 - a) References
 - i) Hamer et al, 2009
 - ii) Savage et al, 2007
 - iii) Mackay et al, 2010
 - b) Sites
 - i) Illinois
 - ii) Tennessee
 - iii) Louisiana
 - c) Top 8 hosts explain most of the variation of blood feeding at each site
 - i) Robin - 28.1% overall
 - ii) Cardinal - 9.6% overall
 - iii) Human - 7.9% overall
 - iv) Grackle - 6.2% overall
 - v) House sparrow - 5.7% overall
 - vi) Mourning dove - 4.7% overall
 - vii) Domestic dog - 3.8% overall
 - viii) Opossum - 2.5% overall
 - ix) Horse - 2.1% overall
 - x) Northern raccoon - 7.4% overall
 - d) Variation seen at each site
 - i) Some due to availability of the host
 - ii) Some unexplained
 - (1) Can not assume hybrids are the reason
 - (2) Can not assume form *molestus* are the reason
 - iii) What about high rates of human blood feeding in Chicago?
 - (1) Hamer et al, 2009
 - (2) Collection methods??
 - (3) Urbanization??
 - iv) Bloodmeal databases are available in the literature