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) Anautagenous
        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-quincs 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