

Tracing the origin of US BMSBs



Jiawu Xu, Dina Fonseca, George Hamilton,
Kim Hoelmer, Anne Nielsen

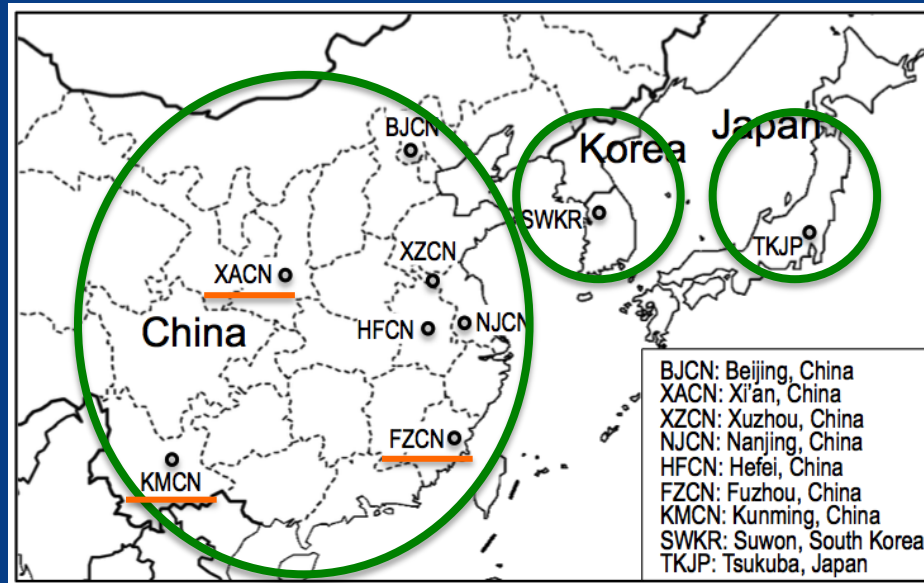
BMSB: an invasive pest in the US

- Native range: China, Taiwan, Korea and Japan
- Invasion to the US: Allentown, PA in 1996;
now in 39 states
- Damages: serious loss in agriculture, residential nuisance, erosion of local biodiversity
- Control: insecticide application

US BMSBs

- Where did they come from?
- How many introductions?
- What's the likely size of founding population?
- How about the genetic diversity in the US?

Samples



East Asia: CN (7), KR
(1),

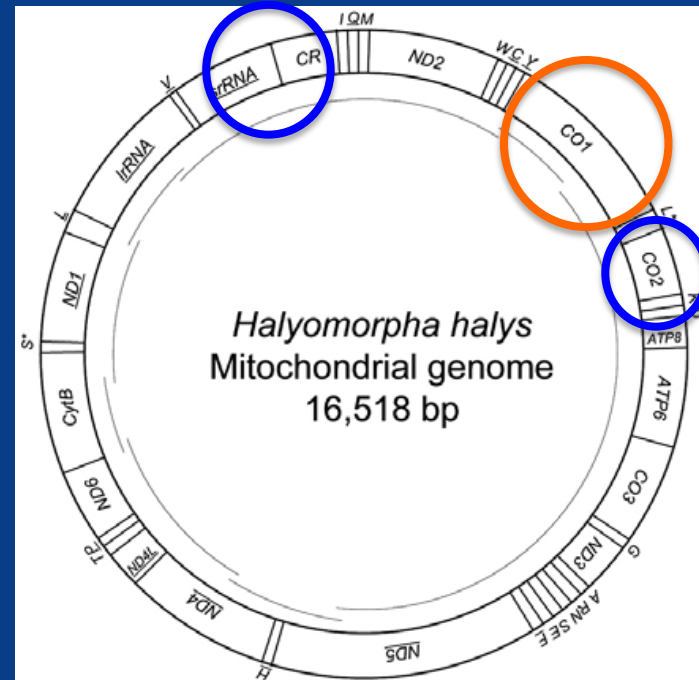
JP (1); $N = 5-21$

US: 10 states; $N = 2-12$

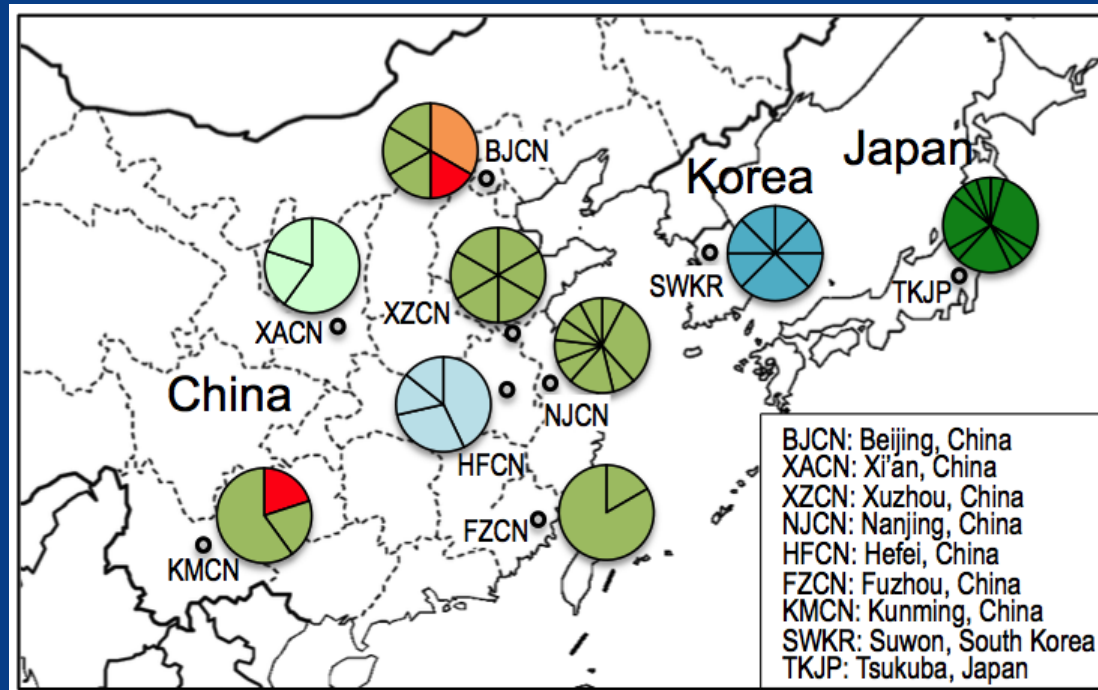


Genetic analysis – mtDNA sequences

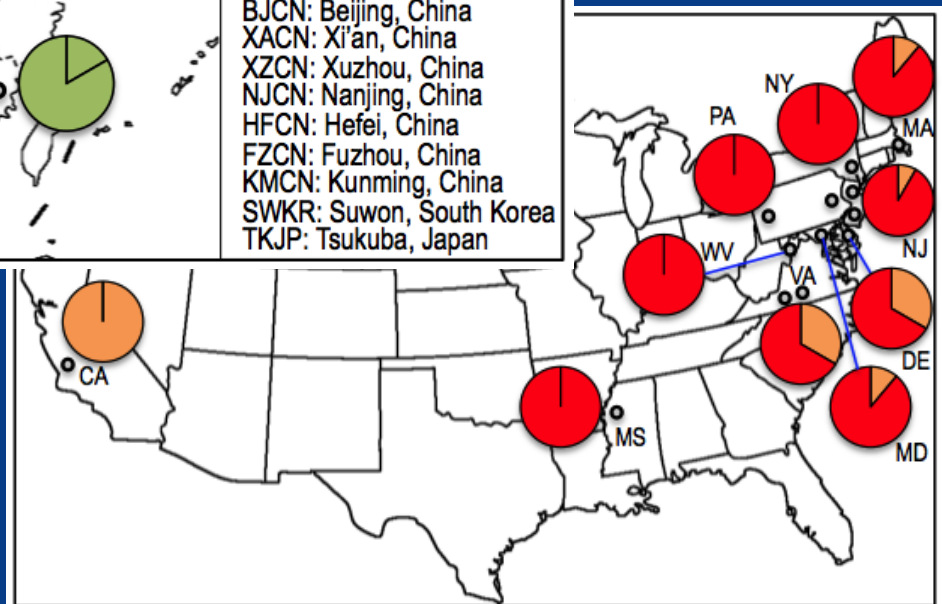
- Cytochrome c oxidase II (COII)
- 12S ribosomal RNA to control region (12S/CR)
- Cytochrome c oxidase I (COI)



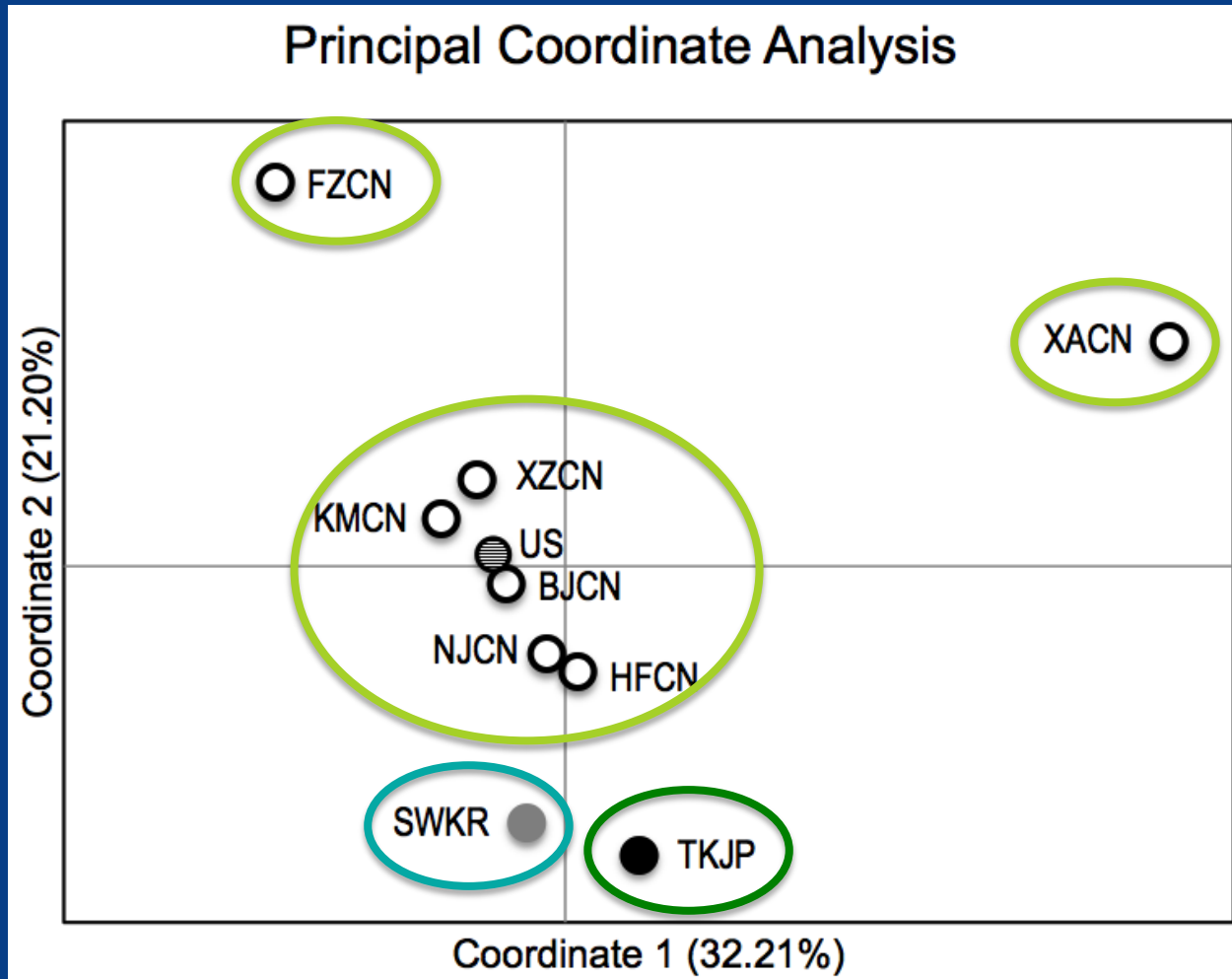
Haplotype distribution



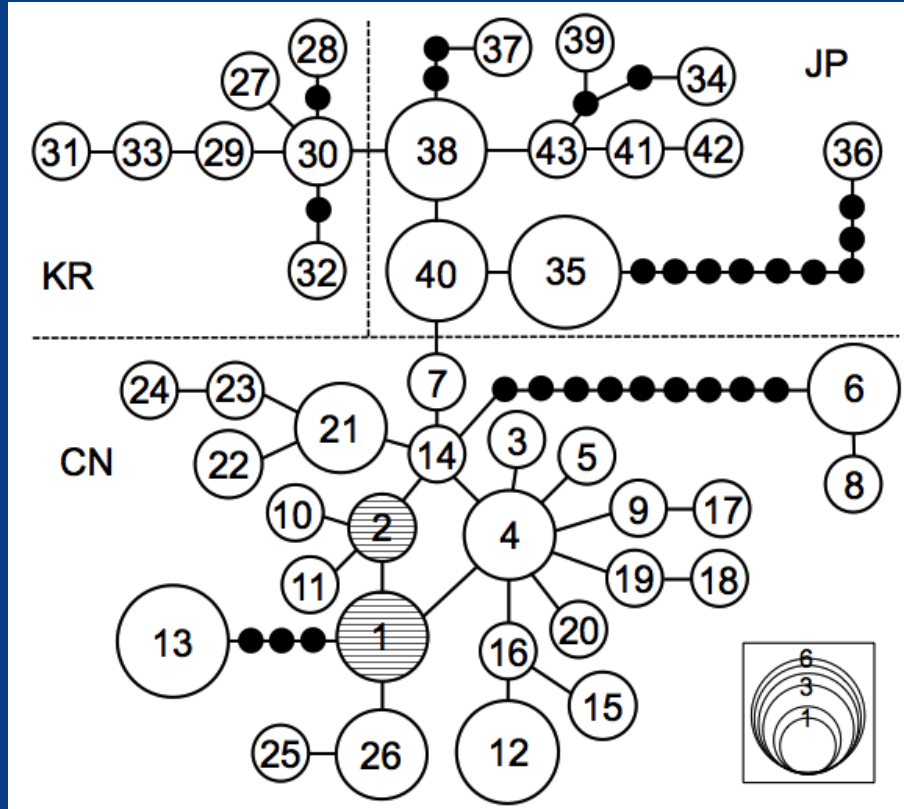
Red & orange
haplotype
frequency in
BJCN: $\frac{1}{6}$ and $\frac{1}{3}$



Relationship among populations



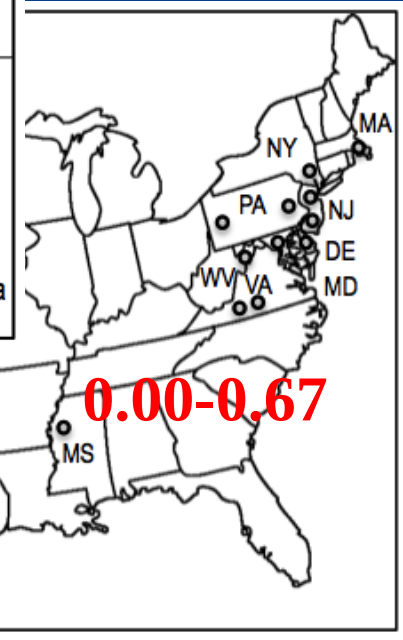
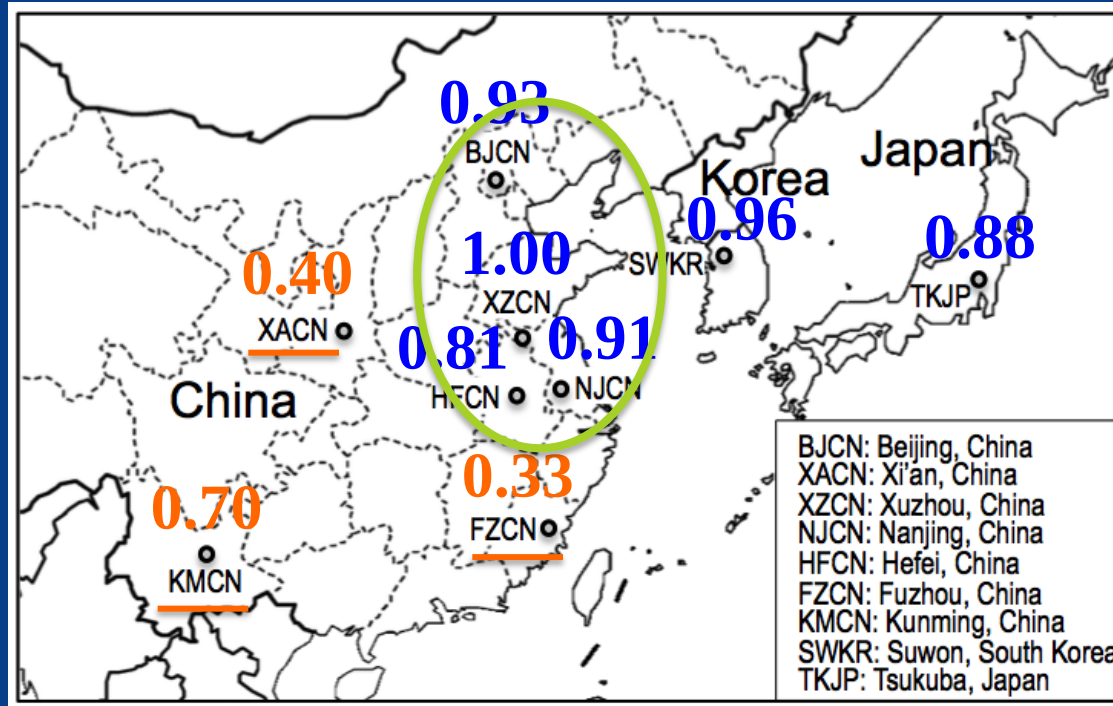
Haplotype network



Inference from Nested Clade Analysis (NCA):

- Restricted gene flow but with some long distance dispersal
- BJCN+XZCN+NJCN as the distributional center in China

Genetic diversity



Native: 43 haps in
77 bugs

US: 2 haps in
55 bugs

Summary

- Significant genetic differentiation in natives
- High genetic diversity in East Asia versus extremely low diversity in the US
- US BMSB originated from **Beijing** area, China
- Single introduction with small population size matches the invasion to the US

Acknowledgments

- Collaborators & the general public for the critical samples
- NJAES Hatch Project support



Questions?