Tracing the origin of US BMSBs

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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

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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?

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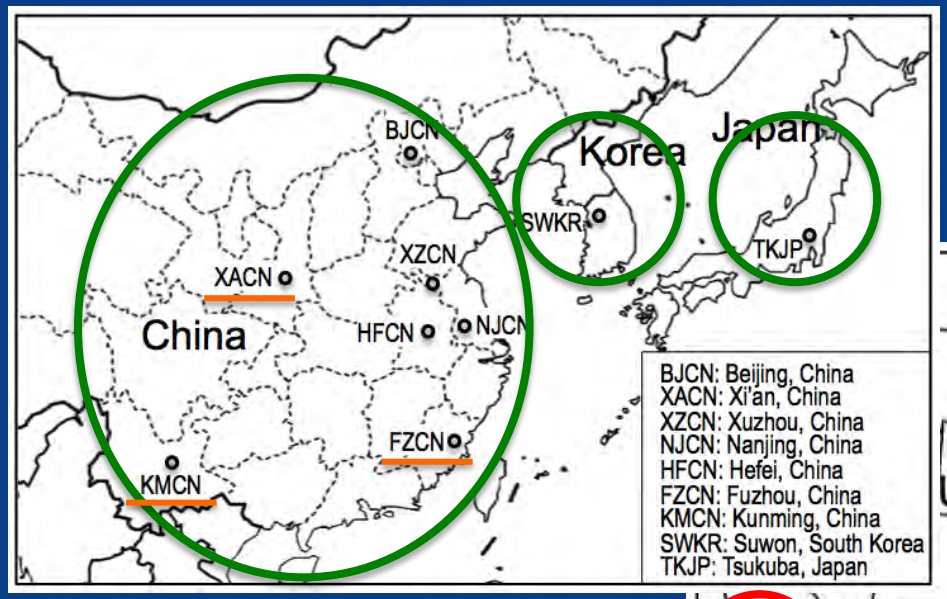
Samples



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

JP (1); N = 5-21

US: 10 states; N = 2-12

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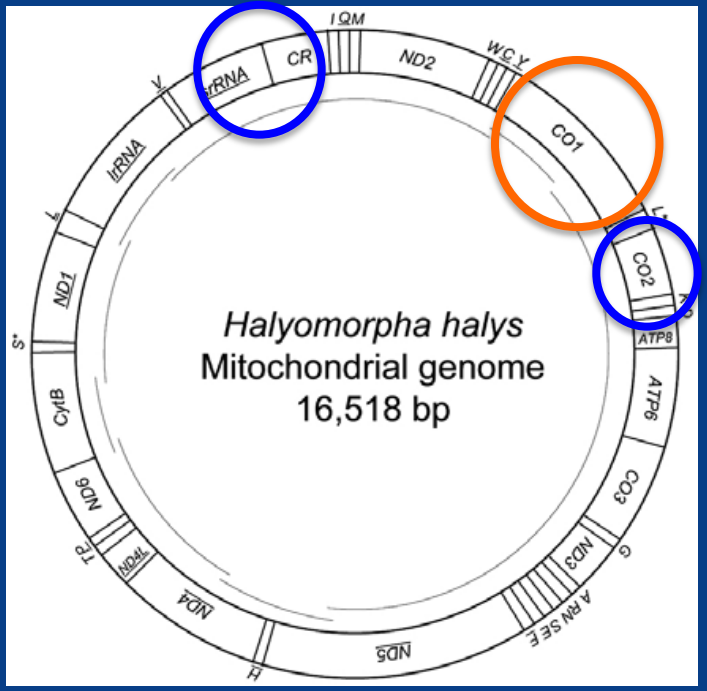
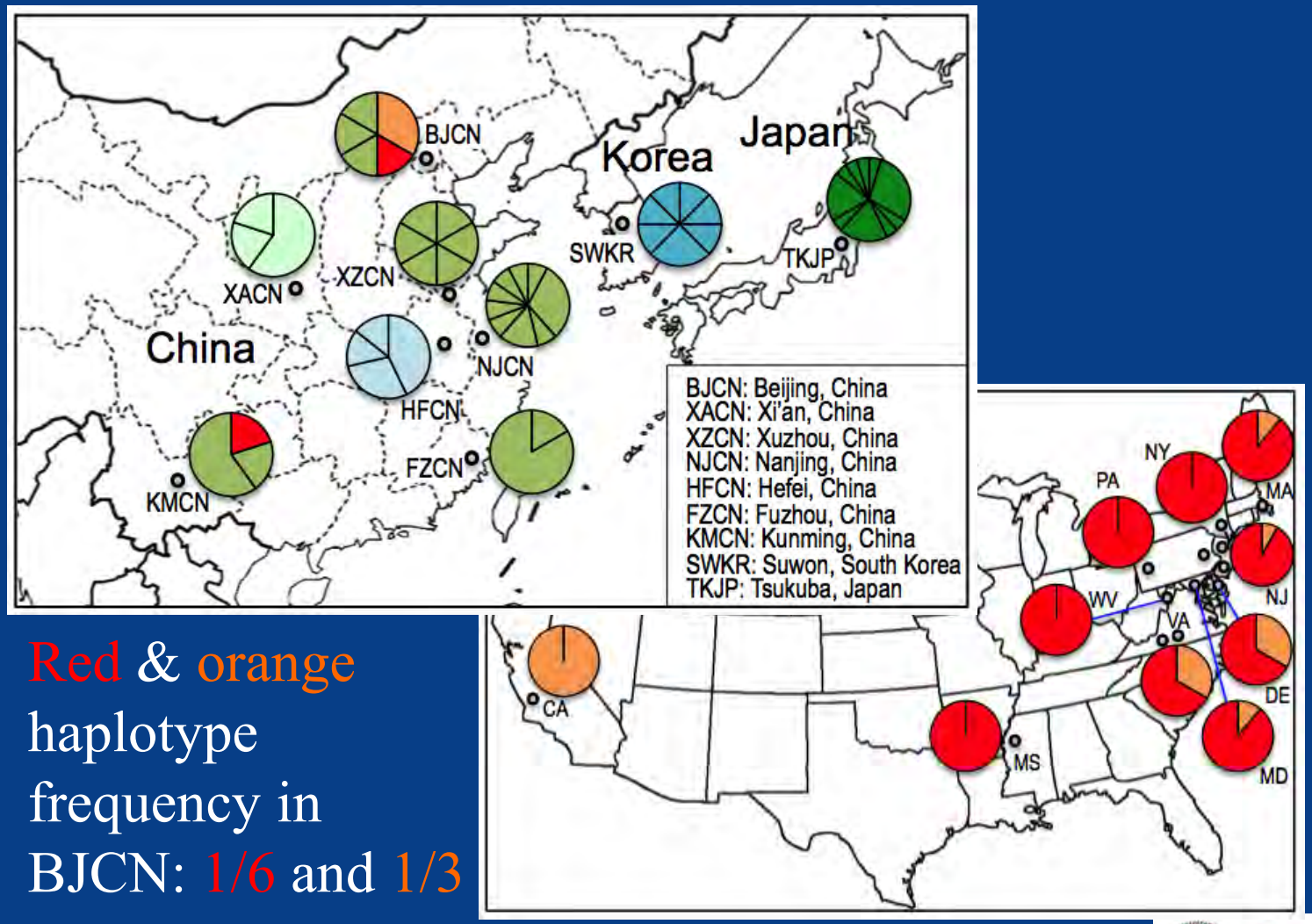
Genetic analysis – mtDNA sequences

- 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: 1/6 and 1/3

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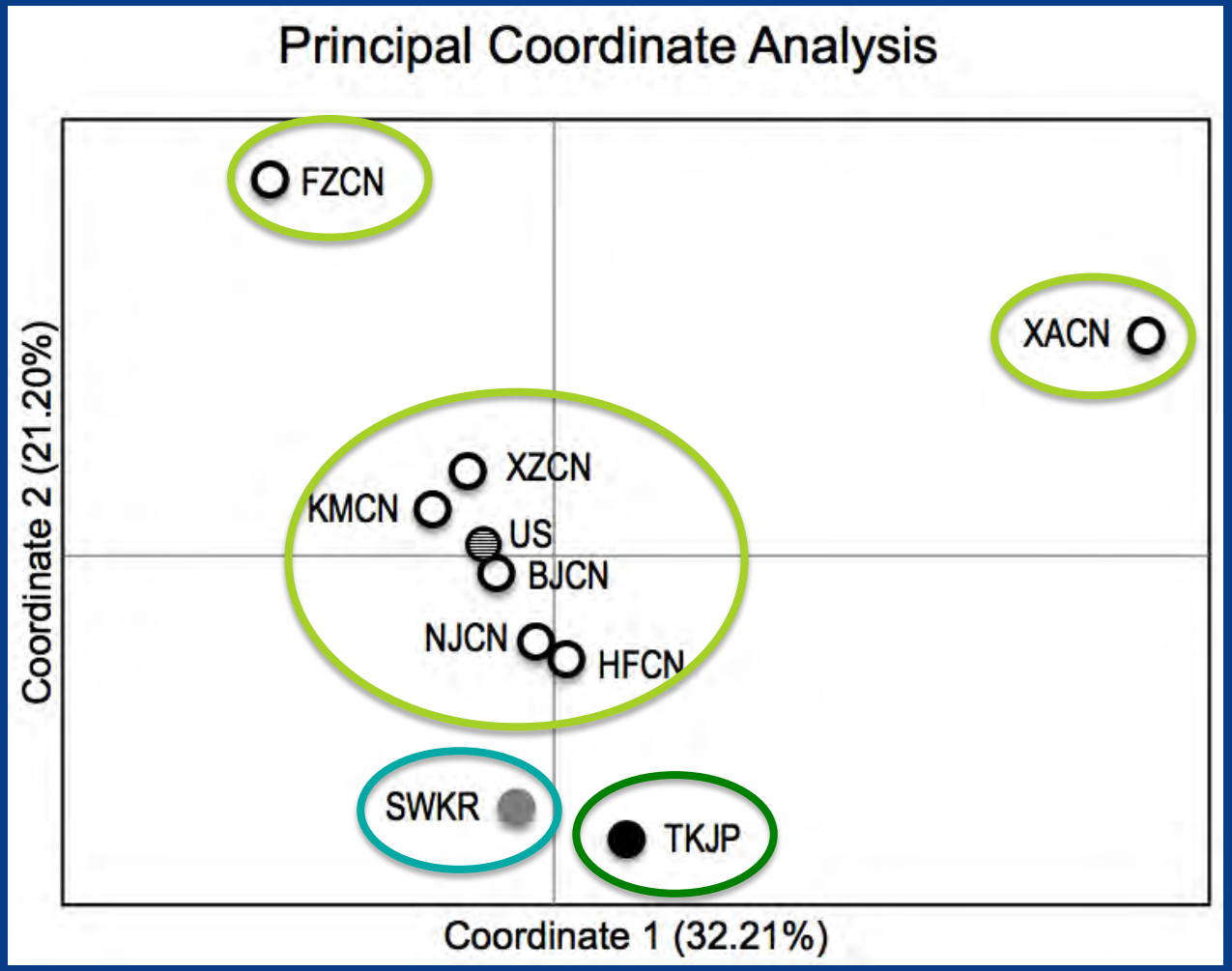
Relationship among populations



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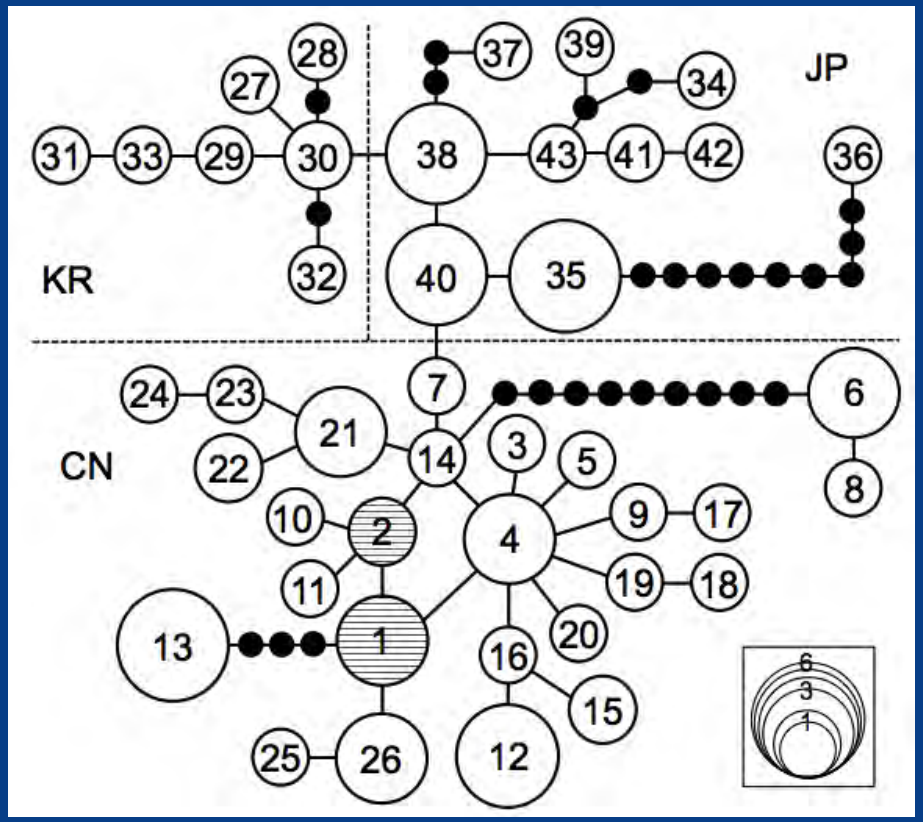
Haplotype network



Inference from Nested Clade Analysis (NCA):

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

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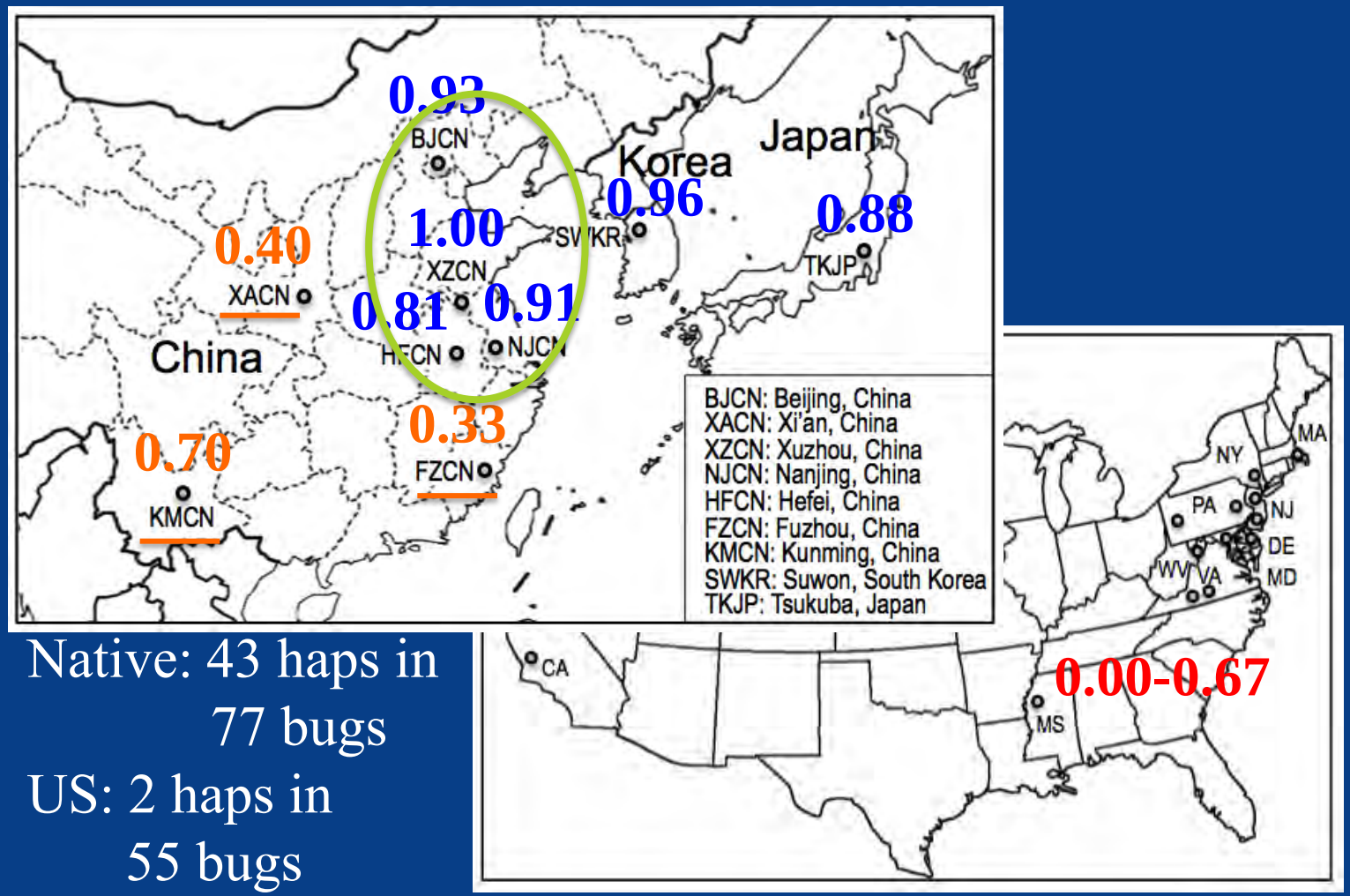
Genetic diversity



Native: 43 haps in 77 bugs

US: 2 haps in 55 bugs

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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

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Acknowledgments

- Collaborators & the general public for the critical samples
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Questions?