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Norton Sound Red King Crab Male Size at Maturity



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NSRKC 2023 SAFE

- “The current NSRKC functional maturity size (>94mm) was inferred from BBRKC by *incorporating* the fact that NSRKC are smaller”
- “Although determining size at functional maturity is important biologically, there is limited utility of this information for Tier 4 crab stock assessment. In Tier 4 stock assessment, size at maturity is used only for calculation of mature male biomass (MMB) and BMSY (average MMB). Harvest control (FOFL) is based on the ratio of projected MMB and BMSY (projected MMB/BMSY)”

BBRKC 2022 SAFE

- “.... no data for estimating size of functional maturity collected in the natural environment. Sizes at functional maturity for male BBRKC have been assumed to be 120 mm CL. This is based on mating pair data collected off Kodiak Island.”



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NSRKC Laboratory Mating Experiments

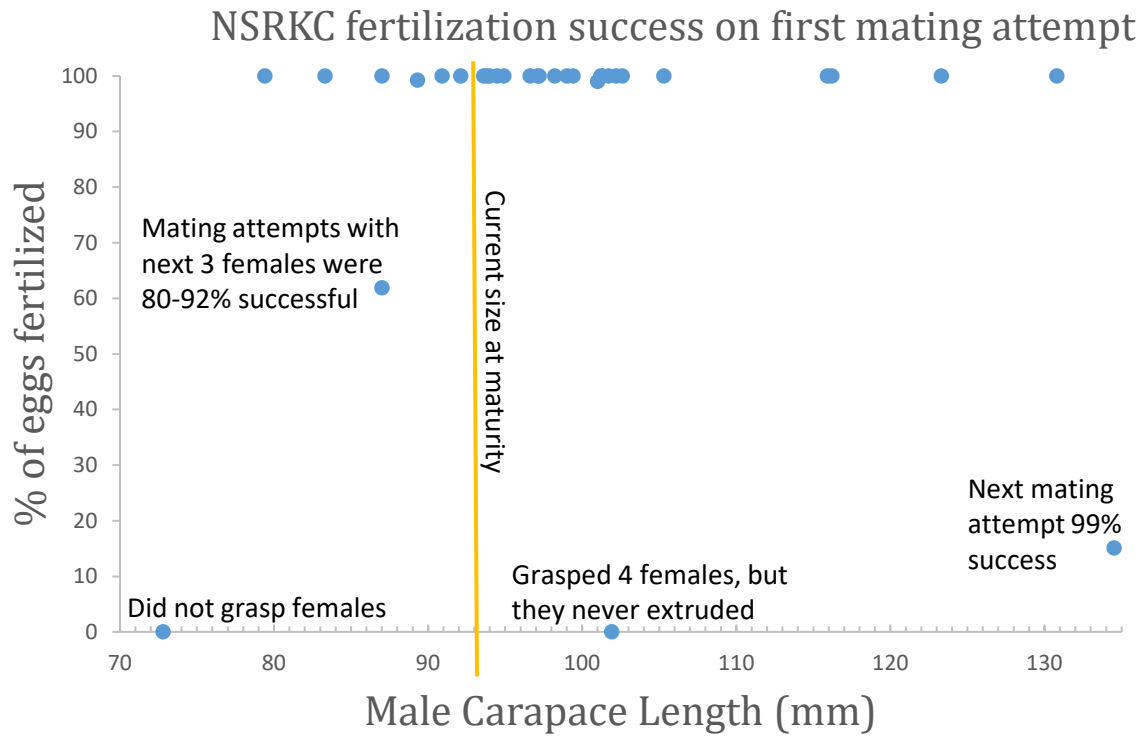
- **Maturity Definition:** Male can successfully fertilize a female clutch (with no competition from other males)
- Isolate grasping pairs
- Female molts, extrudes eggs
- Check for cell divisions 7-10 days later
- Record % fertilization success



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Fertilization Success at First Mating Attempt

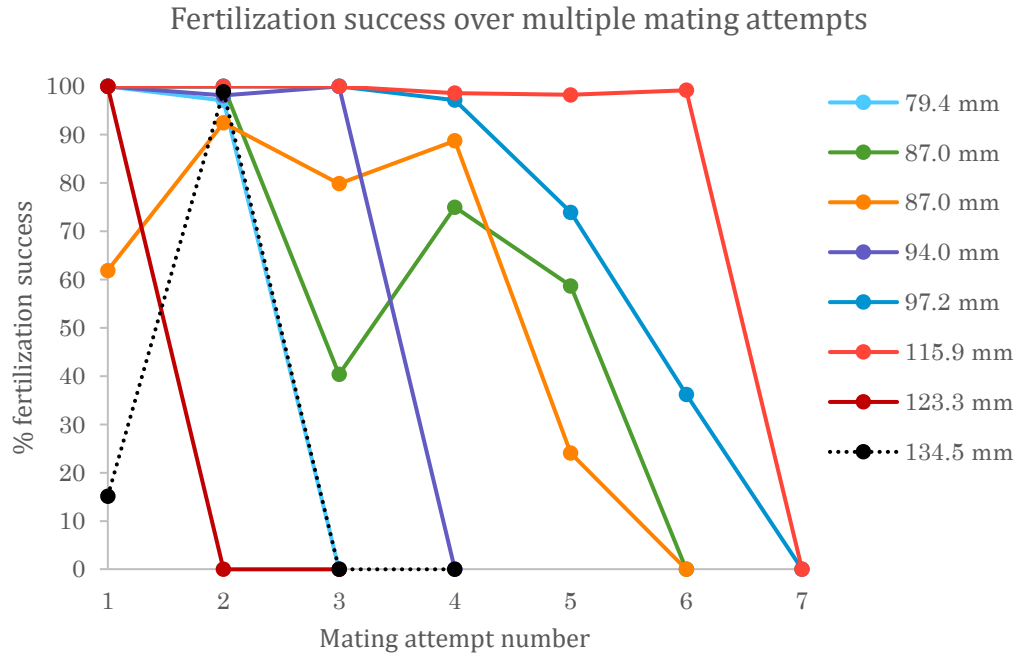
- Near 100% fertilization success down to 79 mm



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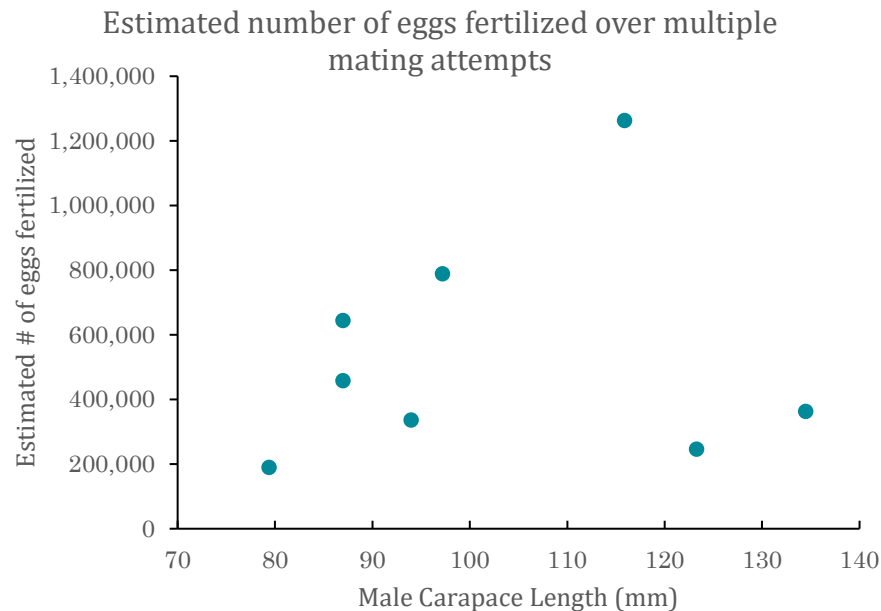
Fertilization Success Over Multiple Mating Attempts

- Allowed 8 males to attempt to mate with unlimited females
- Successful fertilization of up to 6 females (115.9 mm male)



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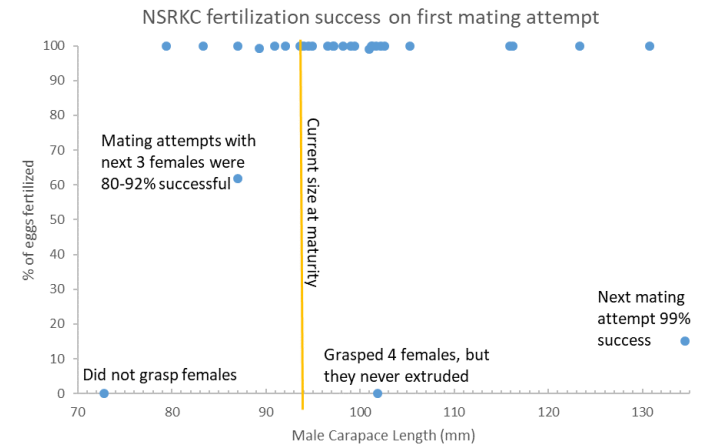
Used Swiney et al. (2012) *J. Shellfish Res.* to convert female carapace length to egg number



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What's Next

- Increase sample size in 70-90 mm range
- Multiple mating for males > 120 mm CL
- Unsuccessful in obtaining more NSRKC in 2022, planned for 2023



Questions for CPT

- **Is this useful?** Is successful fertilization of females in a laboratory setting a useful way to define size at maturity? Smaller males may not typically mate if they are competitively excluded, but they seem capable if no larger males are present..... is this how you would like to define size at maturity?
- **If the answer is yes,** should the same experiments be conducted for BBRKC?

