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Lesser Chestnut Weevil: Lifecycle and Phenology

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The lesser chestnut weevil (*Curculio sayi*) is a **re-emerging pest of American chestnut trees**. Originally documented when American chestnut trees were dominant on the east coast, the lesser **chestnut weevil had mostly disappeared until resurfacing in the last decade with the re-expansion of chestnuts** on the east coast. This weevil can expand rapidly, appearing and reaching greater than 80% infestation in less than two years. Here, we **explore the lifecycle and phenology of this chestnut weevil documenting the larval, pupal, and adult stages**. We also highlight phenologies distinctive of a univoltine northern population peaking in November. Effective means of **monitoring these populations** are also presented with an eye towards **improving management** and **recognition** of this **re-emergent, charismatic weevil**.

Phenology

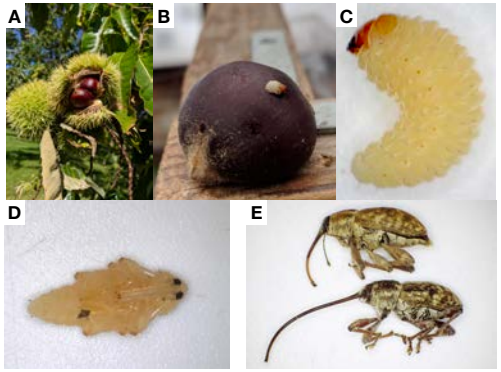


Figure 3. The lesser chestnut weevil (*C. sayi*) lifecycle. (**A**) *C. sayi* adult females lay eggs in chestnuts (depicted in their burrs). (**B**) *C. sayi* larvae feed inside the nut and, when they reach their last instar, create a hole and emerge from the chestnut. (**C**) *C. sayi* larvae emerge out of the holes and fall to the ground, where they burrow to about 5 cm below the soil line. (**D**) *C. sayi* pupate in the soil (extracted pupae depicted). (**E**) *C. sayi* pupae then eclose. Males (above with shorter rostrum) and females (below with longer rostrum) then emerge from the soil to continue the lifecycle.

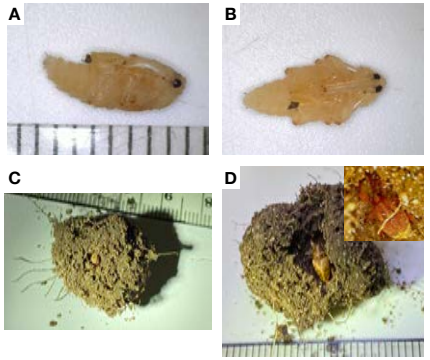


Figure 4. Subterranean life stages of the lesser chestnut weevil (*C. sayi*). (**A**) Side profile of *C. sayi* pupa. Larvae burrow into the soil to construct pupal chambers in which they pupate. Ruled divisions denote millimeters. (**B**) Ventral view of *C. sayi* pupa. (**C**) *C. sayi* adults eclose from pupae but can remain in the soil for a period of time in the pupal chamber. Small-ruled divisions denote millimeters and large-ruled divisions denote centimeters. The adult *C. sayi* weevil is oriented downward; only the posterior is visible. (**D**) *C. sayi* adult gently excavated from pupal chamber. Inset provides close up of head and rostrum. Ruled divisions denote millimeters.

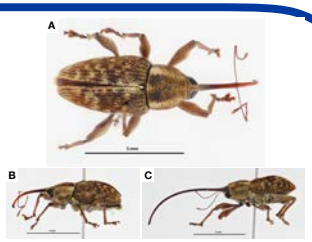
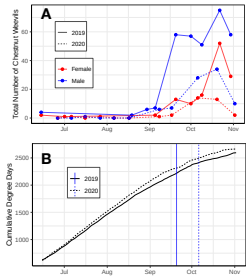
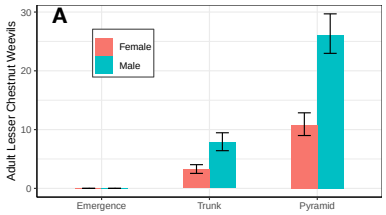


Figure 5. Adult lesser chestnut weevils (*C. sayi*). (**A**) Dorsal view of adult *C. sayi* male. (**B**) Side view of adult *C. sayi* male. (**C**) Side view of adult *C. sayi* female. Note difference in rostrum sizes.



Monitoring



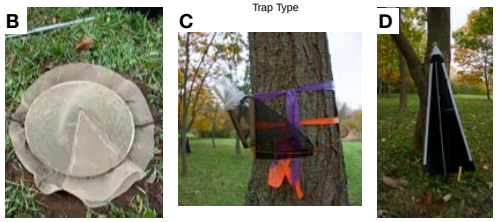


Figure 2. Monitoring the lesser chestnut weevil (*C. sayi*). (**A**) *C. sayi* male and female trap catch across three trap types. No weevils were ever caught in emergence traps. Bars and error bars denote average monthly catch and 95% confidence intervals, respectively. (**B**) Emergence trap/microcosm cover. This picture shows a conical cover for a buried microcosm. The emergence trap is functionally similar but 1 m in diameter. These traps were used to collect adult weevils emerging from the soil. (**C**) Trunk trap for collecting adult *C. sayi* moving upward along tree trunks. (**D**) Pyramid (Tedders) trap for collecting adult *C. sayi* emerging from the ground and moving toward dark upright objects.

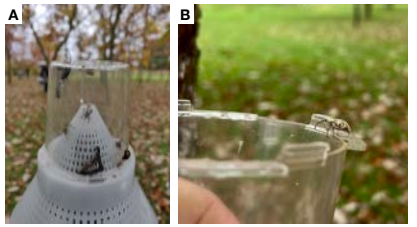


Figure 6. Adult lesser chestnut weevils (*C. sayi*) were collected in trunk and pyramid traps using a conical plastic mesh that terminated in a clear plastic cup perforated at the end. (**A**) Many adult *C. sayi* were eager to escape. Note rostrum of adult female *C. sayi* extending above the trap. (**B**) Some *C. sayi* adults preferred to hang around.

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