Gossypol is a terpenoid aldehyde found in cotton (*Gossypium hirsutum* L.) glands and helps protect the seed from pests and pathogens. However, gossypol is toxic to many animals, so the seed is used mainly in cattle feed, as ruminants are tolerant to the effects of gossypol. In order to develop strategies to modify gossypol in cottonseed, it would be useful to better understand the development of the gossypol containing glands. This study focuses on determining the point in seed development where gossypol glands are initiated and filled with gossypol. The study used a VHX-600 Keyence Digital Microscope with a VH-Z20R (20X to 200X) lens to capture developing ovule (seed) images at 14, 16, 18, 20, and 22 days after flowering (DAF). Bolls were harvested from replicated field trials with ten gabled cotton lines and two glandless varieties as controls. One boll per plot was harvested for each DAF time point and five different sets of time intervals were collected in each of two years. Imaging at 14, 16, 18, 20, and 22 days after flowering (DAF) revealed empty glands forming as early as 16 DAF and as late as 20 DAF. For most of the varieties, some of the glands were filled by 18 DAF and as early as 16 DAF for ultra early lines.