

Research on acorn production phenology,
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Okinawa Island

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題 目	Research on acorn production phenology, granivorous pest insects of Fagaceous tree species and its soil environment in subtropical Okinawa Island. (亜熱帯沖縄島に生育するブナ科堅果の生産フェノロジーと堅果食昆虫および土壤環境に関する研究)
<p>How the Fagaceous trees produce acorns has been the subject of various studies. According to some researchers not only is this production ecologically important, but it also provides valuable data about plant renewal. For many years, a lot of information has been known about how the acorns of the <i>Fagus crenata</i> grow. There seems to be a peak in acorn production every five to seven years. However, more research is needed to examine this cycle of acorn production.</p> <p>Subtropical Okinawa has a variety of plants and habitats and as such is an important location for academic research. The dominant species of Fagaceae in this region is the <i>Castanopsis sieboldii</i>. Another five species (<i>Lithocarpus edulis</i>, <i>Quercus miyagii</i>, <i>Quercus glauca</i> var. <i>amamiana</i>, <i>Quercus salicina</i>, <i>Quercus phillyraeoides</i>) of this family can also be found. The Fagaceae acorn has become a valuable food resource for the local forest animals. However little is known on this topic. This study focuses on four kinds of Fagaceae acorns found on the main Okinawan island, the volume of acorns produced, the cycle of acorn production, the insects that eat these acorns, acorn feeding guild and the Fagaceae acorns growing soil.</p> <p>Findings showed that the production cycle which has been observed in Beech trees in other regions also exists in Okinawa. <i>Lithocarpus edulis</i> produced acorns in abundance for four consecutive years while production in the fifth year will be much lower, with noticeable variation among individual trees. <i>Castanopsis sieboldii</i> and <i>Q. glauca</i> var. <i>amamiana</i> had a peak in acorn production every three years, while <i>Q. miyagii</i> produced acorns in alternate years. A correlation between the size of the individual acorns and the number of acorns produced was found. When the size was large, the number produced tended to be small, and vice versa.</p> <p>In the four species of acorn, 14 species of acorn-infesting insects (belonging to four genera) were confirmed; among which, seven species – <i>Poecilips cardamomi</i>, <i>P. Graniceps</i>, <i>P. Variabilis</i>, <i>Neoblastobasis biceratala</i>, <i>Cryptaspa marginifascata</i>, <i>Phaecadohora fimbriata</i>, <i>Drosolina asahinai</i> – were recorded for the first time in Okinawa.</p> <p>Compared to other prefectures, Okinawa has more species in the post-dispersal acorn feeding guild. In other prefectures, <i>Curculio hilgendorfi</i> was only identified in the acorns of <i>Castanopsis</i>. The post disposal acorn feeding guild have been currently identified in <i>L. edulis</i> in Kagoshima, and <i>L. edulis</i>, <i>C. sieboldii</i>, <i>Q. miyagii</i>, <i>Q. glauca</i> var. <i>amamiana</i> in Okinawa main island and it seems to harm other acorns as well as those of the <i>Castanopsis</i> family. <i>C. hilgendorfi</i> is considered to have a significant effect on the survival of Fagaceae acorns of Okinawa Island.</p> <p><i>Lithocarpus edulis</i>, <i>C. sieboldii</i>, <i>Q. miyagii</i>, grow in the acidic ‘Kunigmai Maaji’ soils, while <i>Q. glauca</i> var. <i>amamiana</i> grows on soils from Ryukyu limestone areas. The amount of nutrient salts differs between these two areas. This explains why the female flower fenology of <i>L. edulis</i>, <i>C. sieboldii</i>, <i>Q. miyagii</i> occurs biannually and the <i>Q. glauca</i> var. <i>amamiana</i> annually.</p>	