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## **Investigation of gut microbiota of green dock beetles of the genus *Gastrophysa***

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The green dock beetles of the genus *Gastrophysa* preferentially feed on broad-leaved dock *Rumex obtusifolius*, a relatively common weed plant and an invasive species originating from Europe, which causes ecological and economical problems in many countries. Oxalate, which is generally toxic to animals, is present at a high concentration in the leaves of *R. obtusifolius* but accumulates in the bodies of *Gastrophysa atrocyanea* only when treated with antibiotics. This suggests gut microbiota of *G. atrocyanea* may play a significant role in oxalate degradation and thereby enables *Gastrophysa* beetles to live on *R. obtusifolius*. To understand the gut microbiota in detail, we constructed and analyzed metagenomic 16S rRNA gene libraries of gut microbiota in *G. atrocyanea* and *Gastrophysa viridula* collected in multiple sites in Japan and Germany, respectively. The family *Enterobacteriaceae* dominated the gut microbiota of both *Gastrophysa* species, and phylotypes affiliated with the species *Rahnella*, *Serratia*, and *Pantoea* formed largest populations. Interestingly, 16S rRNA gene sequence of the phylotype of *Rahnella* was almost identical to that of a novel strain isolated from *G. atrocyanea* using semi-synthetic medium supplemented with oxalate. A gene homolog of oxalate decarboxylase, which sequence was assigned to *Enterobacteriaceae*, was found in the metagenomic library of *G. viridula*, which suggests that oxalate is converted to formate in the gut of the beetles.