イスラエル及びカリフォルニアでアボカド生産に脅威を与えている菌養性
Euwallacea属キクイムシに培養される新種、Fusarium euwallaceae

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イスラエル及び米国カリフォルニアのアボカド生産は外来性の菌養性Euwallacea属キクイムシとそれが培養するFusarium属菌による被害で脅威にさらされる。母虫は上顎性菌嚢をもち、共生者のFusarium属菌を運搬する。多領域のDNA塩基配列に基づく分子系統学的解析では、少なくとも9種のFusarium属菌がEuwallacea属キクイムシに培養され、F. solani種複合体の新クレードを構成した（Kassonら2013）。Fusarium ambrosiumを除き他の8種は未記載である。本研究ではイスラエル及び米国カリフォルニアのアボカドに生息するEuwallacea属キクイムシに培養されるFusarium属菌について分子系統学的並びに形態学的に解析した。EF-1α, RPB1, RPB2, ITS+LSU rDNAの4遺伝子のDNA塩基配列に基づく分子系統解析は、本菌がF. ambrosiumとごく近縁な未記載種であることを示した。本菌やF. ambrosium、他の関連菌の形態学的比較では、Fusarium属共生菌の大部分が特徴的な「イルカ」型多隔壁分生子を生じ、大きさはほぼ同様であった。イスラエル及び米国カリフォルニア産の本菌は、PDA上での1ヶ月以上の培養で緑色の分生子塊を生じ、その中に形成された分生子には細胞が無色に加え、顕著に青色や茶色に着色したものが多く含まれた。一方、F. ambrosium及び他の種では、本種ほど明瞭な緑色の分生子塊と着色分生子のセットを生じなかった。上記形態的特徴と分子系統学的知見に基づき本種を新種、Fusarium euwallaceaeと命名、公式に記載した（Freemanら2013）。
Fusarium euwallaceae, a novel species cultivated by a Euwallacea ambrosia beetle that threatens avocado production in Israel and California by T. Aoki¹, S. Freeman², M. Sharon³, M. Maymon⁴, Z. Mendel⁵, A. Protasov⁶, A. Eskalen⁷, K. O'Donnell⁸ (¹Natl. Inst. Agrobiol. Sci.; ²-⁶ARO, Volcani Center; ⁷Univ. California; ⁸NCAUR, USDA-ARS)

Avocado production in Israel and California, USA is facing a serious threat due to damage caused by an invasive Euwallacea ambrosia beetle and a novel Fusarium that it cultivates as a source of food. Adult female beetles possess mandibular mycangia within which they carry the Fusarium symbiont. At least nine fusaria, all of which appear to be farmed by Euwallacea spp., form a novel clade within the F. solani species complex based on phylogenetic analyses of multilocus DNA sequence data (Kasson et al. 2013). With the exception of F. ambrosium, the eight other species-level lineages were new to science. The Fusarium species cultivated by the Euwallacea sp. inhabiting avocado trees in Israel and California was characterized phylogenetically and morphologically. Molecular phylogenetic analyses of DNA sequences from portions of four genes (i.e., EF-1α, RPB1, RPB2 and ITS+LSU rDNA) indicated that it was an undescribed species closely related to F. ambrosium. Morphological comparison of the fungus in Israel/California, F. ambrosium and related species revealed that most of the Fusarium symbionts formed characteristic “dolphin-shaped” multiseptate conidia that were similar in size and swollen distally. In contrast to the other fusaria, the novel species in Israel/California formed dark green masses of sporodochial conidia after 1 month cultivation on potato dextrose agar. Microscopic examination of the dark green sporodochia revealed that many conidia possessed bluish and brownish pigmentation, while some were hyaline. None of the other fusaria including F. ambrosium produced the combination of remarkable dark green conidial masses and conidia with bluish or brownish pigmentation. Given the morphological and molecular phylogenetic findings, the symbiotic fungus in Israel/California was formally described as the novel species F. euwallaceae (Freeman et al. 2013).
Taxonomy of a *Fusarium* species, associated with an ambrosia beetle infecting avocado trees in Israel by T. Aoki\(^1\), S. Freeman\(^2\), M. Sharon\(^3\), M. Maymon\(^4\), Z. Mendel\(^5\), A. Protasov\(^6\), A. Eskalen\(^7\), K. O’Donnell\(^8\)  
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The avocado production in Israel and California, USA is recently facing a serious threat due to damages caused by the invasive ambrosia beetle *Euwallacea* sp. This ambrosia beetle cultivate a *Fusarium* species in its natal galleries and feed its larvae. Adult female beetles have mandibular mycangia and carry its *Fusarium* symbiont. Symbiotic fusaria related to *Euwallacea* beetles, including the avocado beetle, were analyzed molecular-phylogenetically by Kasson et al. (2013) where 9 phylogenetic species were elucidated. Except for *F. ambrosium*, previously recombined from a *Monacrosporium*, all of the 8 other species were formally undescribed. We analyzed phylogenetically and morphologically the *Fusarium* species symbiotic to *Euwallacea* sp. inhabiting in avocado trees in Israel. Based on molecular-phylogenetic analyses according to DNA sequences of EF-1α, RPB1, RPB2 and ITS+LSU rDNA, this species was shown to be undescribed but closely related to *F. ambrosium*. Morphological comparison of the Israeli fungus with *F. ambrosium* and related species showed that these *Fusarium* symbionts formed characteristic “dolphin-like” multisepate-conidia, swollen in the upper part. The “dolphin-like” conidia among these species were similar in size. In culture on PDA for more than 1 month, the fungus formed typical dark green masses of sporodochial conidia. They contained obviously bluish- and brownish-pigmented conidia, together with non-pigmented hyaline ones. In contrast, the other species including *F. ambrosium* did not show these characteristic features, having both dark green conidial masses and bluish- or brownish-pigmented conidia, except for rare production of some pigmented conidia. Based on these features, the symbiotic fungus of the *Euwallacea* beetle species in Israel was described as a new species, *Fusarium euwallacea*. 