Testing a invasive species hypothesis on Platypus quercivorus, a vector insect of the Japanese oak wilt by DNA analysis among regional populations

2007 Fiscal Year Final Research Report Summary

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Research Project

Project/Area Number

17405028

Research Category

Grant-in-Aid for Scientific Research (B)

Allocation Type

Single-year Grants

Section

海外学術

Research Field

林学・森林工学

Research Institution

The University of Tokyo (2006-2007)
Kanazawa University (2005)

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Project Period (FY)

2005 – 2007

Keywords

the Javanese oak wilt / Platypus quercivorus / Raffaelea quercivora / Quercus crisnula / DNA analysis / invasive species / hijack / coevolution

Research Abstract

Before starting this project, Platypus quercivorus was recorded from Japan, India, Indonesia, New Guinea, and Taiwan. We collected the species from Thailand and Vietnam, which is the new record of the distribution of this species. We found that two types were distributed in Japan, which were thought to be two independent species ("Japan-Sea type" and "Pacific -Ocean type" in this MS). These two types differed from each other morphologically and genetically. These morphological and genetic differences coincided. Regarding the "Japanese-Sea type" two populations were recognized by DNA analysis: mainland population and central Ryukyu population. Genetic distance between the two populations was farthest among four regional populations by DNA analysis including Thai and Indonesian populations. The mainland population was most close to Thai population, and the central Ryukyu population was to the Indonesian. It was difficult to explain this result by natural pattern. The mainland population was introduced from Thailand after the last glacier age probably by human activity. On contrary, the pathogenic fungus, Raffaelea quercivora did not varied so much as P quercivorus did: R. quercivora that was collected from P quercivorus in Taiwan and Japan were classified into one trade. We hypothesized an origin of the Japanese oak wilt disease as follows: Japan-Sea-type P quercivorus that were introduced from Thailand after glacier age were hijacked by R. quercivora carried by the Pacific-Ocean type at southern Kyushu, in which these two types coexist. Because Quercus crispula is highly susceptible to R. quercivora and because reproduction rate of P quercivorus is high in dead Q. crispula, epidemics of the Japanese oak wilt spread rapidly and the distribution range of the Thai population of the "Japan-Sea-type" P. quericovrus expanded fast

Research Products (48 results)

All | 2008 | 2007 | 2006 | 2005

All | Journal Article | Presentation | Book

[Journal Article] Field trap test for the bioassay of synthetic (1S, 4R)-4-isopropyl-1-methyl-2-cyclohexen-1-ol as an aggregation pheromone of Platypus quercivorus (Coleoptera: Platipodidae) 2008

[Journal Article] カシノナガキクイムシがらみたブナ科樹木萎凋枯死被害(ナラ枯れ)研究の最前線 2008

[Journal Article] ナラ・カシ類の害虫とカシノナガキクイムシ 2008

[Journal Article] Field trap test for the bioassay of synthetic (1S,4R)-4-isopropyl-l-methyl-2-cyclohexen-1-ol as an aggregation pheromone of Platypus quercivorus (Coleoptera : Platipodidae) 2008

[Journal Article] Alien Pests Threatening Biodiversity of Forest Ecosystems 2007

[Journal Article] Gottschalk KW, Alien Pests Threatening Biodiversity of Forest Ecosystems 2007

[Journal Article] Preface: Special feature: population ecology of biological invasion. 2006

[Journal Article] コナラ・アベマキ二次林たおけるカシノナガキクイムシの初期加害状況 2006

[Journal Article] 沿海州・韓国で最近起こったナラ枯れと今後のナラ枯れ研究の展望について 2006

[Journal Article] カシノナガキクイムシ合成フェロモンの開発経緯と今後の展望 2006

[Journal Article] Preface : Special feature : population ecology of biological invasion 2006

[Journal Article] Analysis of Spreading Patterns of Japanese Oak Wilt and the Development of Control Tactics 2006

[Presentation] Raffaelea quercivoraの菌糸の伸展に対する辺材内に形成された反応障壁の効果 2008

[Presentation] Raffaelea quercivoraの系統地理 2008

[Presentation] カシノナガキクイムシのマイクロサテライトDNAマーカーの開発と、林分内個体群構造の解析 2008

[Presentation] カシノナガキクイムシからみたブナ科樹木萎凋枯死被害(ナラ枯れ)研究あ最前線 2007

[Presentation] Raffaelea quercivoraに対するブナ科樹木4種の感受性の差異 2007

[Presentation] Induced Response of Oak Trees to Raffaelea quercivora as a Defense against a Vector Ambrosia Beetle Platypus quercivorus. 2007

[Presentation] Induced Response of Oak Trees to Raffaelea quercivora as a Defense against a Vector Ambrosia Beetle Platypus quercivorus 2007

[Presentation] カシノナガキクイムシの合成フェロモンの誘引試験-主成分の濃度と異性体が捕獲数に及ぼす影響- 2007

[Presentation] カシノナガキクイムシの分類学的検討 2007

[Presentation] 10年間の林分調査におけるカシノナガキクイムシめ穿入と立木枯損動態 2007

[Presentation] カシノナガキクイムシ合成フェロモンの開発経緯と今後の展望 2006

[Presentation] Some implications to the Japanese Oak Wilt: Newly emerged forest pest in Japan 2006

[Presentation] Some implications to the Japanese Oak Wilt : Newly emerged forest pest in Japan 2006

[Presentation] Japanese oak wilt as a newly emerged forest pest in Japan: why does a symbiotic ambrosia fungus kill host trees? 2006

[Presentation] Japanese oak wilt as a newly emerged forest pest in Japan : why does a symbiotic ambrosia fungus kill host trees 2006

[Presentation] 近年の森林における異常現象と森林衰退 2005

[Presentation] Forest decline and anomalies in recent years 2005

[Presentation] Field researches in China and Korea by the EMEA group and some implications to the Japanese Oak Wilt 2005

[Presentation] Analysis of forestdeclination using high resolution satellite image 2005

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[Presentation] 沿海州・韓国で最近起こったナラ枯れと今後のナラ枯れ研究の展望について 2005

[Presentation] 航空写真・GISによるナラ類枯損発生状況の解析Abstracts: The 22nd Symposium of the Society of Population Ecology 22:44 2005

[Presentation] Semi-automatic Tree Crown Detection based on Segmentation using High Spatial Resolution Imagery 2005

[Presentation] Individual Tree Crown Recognition in High Spatial Resolution Remote Sensing Imagery 2005

[Presentation] Detection and Delineation of Killed Tree Crowns of Japanese Oak Wilt(JOW)using IKONOS Imagery 2005

[Presentation] Semi-automatic Tree Crown Detection based on Segmentation using High Spatial Resolution Imagery 2005

[Presentation] Individual Tree Crown Recognition in High Spatial Resolution Remote Sensing Imagery 2005

[Presentation] Detection and Delineation of Killed Tree Crowns of Japanese Oak Wilt (JOW) using IKONOS Imagery 2005

[Presentation] 航空写真によるナラ類枯死木発生位置の分析 講演要旨集 2005

[Presentation] Tree composition change in cool-temperate deciduous forests caused by Japanese oak wilt, a newly emerged forest pest in Japan 2005

[Presentation] Tree composition change in cool-temperate deciduous forests caused by Japanese oak wilt, a newly emerged forest pest in Japan 2005

[Presentation] Identification of Dead Tree of Japanese Oak, Wilt(JOW)using High Spatial Resolution Satellite Imagery 2005

[Presentation] Identification of Dead Tree of Japanese Oak Wilt (JOW) using High Spatial Resolution Satellite Imagery 2005

[Book] Past, Present and Future Environments of Pan-Japan Sea Region (ed.) 2006