Planare: Levis, Norman G Ph.D. Project Title: Dissecting Beneficial Planet-Microbe Interactions and Their Efficacy in the ISS Spaceflight Environment, a Model Study Division Name: Space Biology Program/Dicipiline: Fernerational Planet Program/Dicipiline: No Division Name: No Binama Rescarch Program Edenets: No Illmana Rescarch Program Edenets: No Space Biology Specific Ald Molecular Biology Space Space Spaceflight Environment, a Model Space Space Biology Specific Aldrony: No Plennile: No Plennile: No Plennile: No Plennile: Space Biology Specific Aldrony: Plennile: No Plennile: Space Biology Specific Aldrony: Plennile: Lovinity NERSIY Plennile:	Fiscal Year:	FY 2020	Task Last Updated:	FX 09/11/2019
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Task Description:	 Significance of objectives to NASA and this Solicitation: Deep space exploration or extraterrestrial colonization (e.g., Moon or Mars) will require the ability to sustainably produce plants for human/animal consumption, as well as providing asthetic benefits of plant life to future crews and personnel in extra-terrestrial colonies. One key challenge in spaceflight/microgravity is in overcoming long-standing difficulties in efficaciously providing water and nutrients to germinating and maturing plants. Another important research challenge that has seen little attention is in productively exploiting beneficial plant-microbe interactions in spaceflight/microgravity, particularly for nitrogen (N) fixation. When both challenges are resolved for optimal, productive, and efficacious plant growth in space, this will provide the exciting opportunity to recycle organically bound carbon (C) and N that was sequestered in these plants. Through subsequent recycling of those organics (e.g., derived from human and animal consumption waste and from unused plant parts), this will help enable sustainable plant growth over multiple generations. Another benefit of studying beneficial plant microbe interactions is at the fundamental science level, i.e., by gaining much improved understanding of how the spaceflight/microgravity environment affects this important purposes of our 2 Specific Aims are to initially dissect, understand, and optimize plant growth/development in spaceflight/microgravity via exploiting beneficial plant-microbe interactions. Then to ultimately recycle organic C and N from them suitable for subsequent multiple plant generations. To do this, we will use model Medicago plant species (e.g., aflafa), and its beneficial bacterial symbiont, which together can potentially displace the need for N-containing fertilizer in spaceflight/microgravity. Specific Aims: 1. Comprehensively compare and contrast efficacy of beneficial symbiotic plant-microbe interactions between Medicago and Sinorhizobiu
Rationale for HRP Directed Research:	
Research Impact/Earth Benefits:	
Task Progress:	New project for FY2020.
Bibliography Type:	Description: (Last Updated: 01/22/2025)