

(19) World Intellectual Property
Organization
International Bureau



(10) International Publication Number

WO 2018/140479 A8

(43) International Publication Date
02 August 2018 (02.08.2018)

WIPO | PCT

(51) International Patent Classification:

A01G 31/00 (2018.01) *A61K 35/745* (2015.01)
A01N 25/26 (2006.01) *A61K 35/747* (2015.01)
A61K 35/74 (2015.01) *C02F 3/32* (2006.01)

(71) Applicant: **FLAGSHIP PIONEERING, INC.** [US/US];
55 Cambridge Parkway, 8th Floor 800E, Cambridge, MA
02142 (US).

(21) International Application Number:

PCT/US2018/015025

(22) International Filing Date:

24 January 2018 (24.01.2018)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

62/450,017 24 January 2017 (24.01.2017) US
62/583,736 09 November 2017 (09.11.2017) US

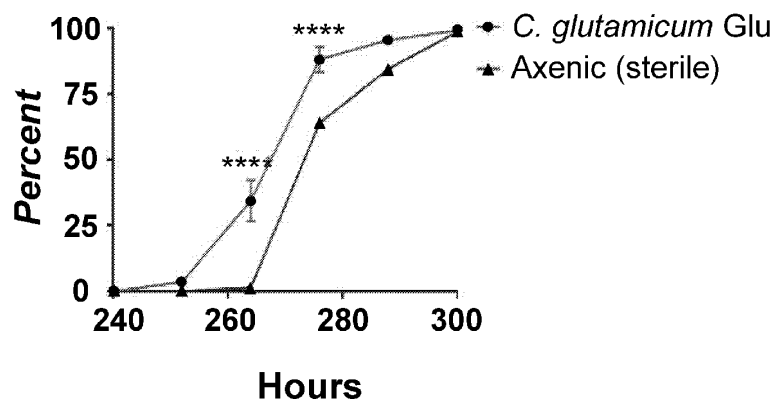
(72) Inventors: **MARTINEZ, Ignacio**; 36 Moon Hill Rd, Lexington, MA 02421 (US). **ARMEN, Zachary, Garo**; 1200 Washington St. Unit 412, Boston, MA 02118 (US). **FRIEDLANDER, Jonathan**; 13 Union Street, Cambridge, MA 02139 (US). **CEZAR, Christine**; 2454 215 Ave SE, Sammamish, WA 98075 (US). **MARTIN, Barry, Andrew**; 150 Mount Vernon St, Boston, MA 02108 (US). **AVENDANO AMADO, Maier, Steve**; 10 Glassworks Ave, Apt 411, Cambridge, MA 02141 (US).

(74) Agent: **ELBING, Karen, L.** et al.; Clark & Elbing LLP, 101 Federal Street, 15th Floor, Boston, MA 02110 (US).

(54) Title: COMPOSITIONS AND RELATED METHODS FOR AGRICULTURE

Fig. 1

Total flies



(57) **Abstract:** Provided herein are agents, compositions, and methods for agricultural use, e.g., for altering the level, activity, or metabolism of one or more microorganisms resident in a host nematode or arthropod (e.g., honeybee or silkworm), the alteration resulting in an increase in the fitness of the host. The invention features a composition that includes an agent (e.g., phage, peptide, small molecule, antibiotic, or combinations thereof) that can alter the host's microbiota in a manner that is beneficial to the host. By promoting favorable microbial levels, microbial activity, microbial metabolism, and/or microbial diversity, the agents described herein may be used to increase the fitness of a variety of beneficial nematodes or arthropods, such as bees and silkworms, utilized in agriculture and commerce.

[Continued on next page]

(81) Designated States (*unless otherwise indicated, for every kind of national protection available*): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IR, IS, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (*unless otherwise indicated, for every kind of regional protection available*): ARIPO (BW, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU, TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG).

Declarations under Rule 4.17:

- *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*
- *as to the applicant's entitlement to claim the priority of the earlier application (Rule 4.17(iii))*

Published:

- *with international search report (Art. 21(3))*
- *with sequence listing part of description (Rule 5.2(a))*

(48) Date of publication of this corrected version:

20 September 2018 (20.09.2018)

(15) Information about Correction:

see Notice of 20 September 2018 (20.09.2018)