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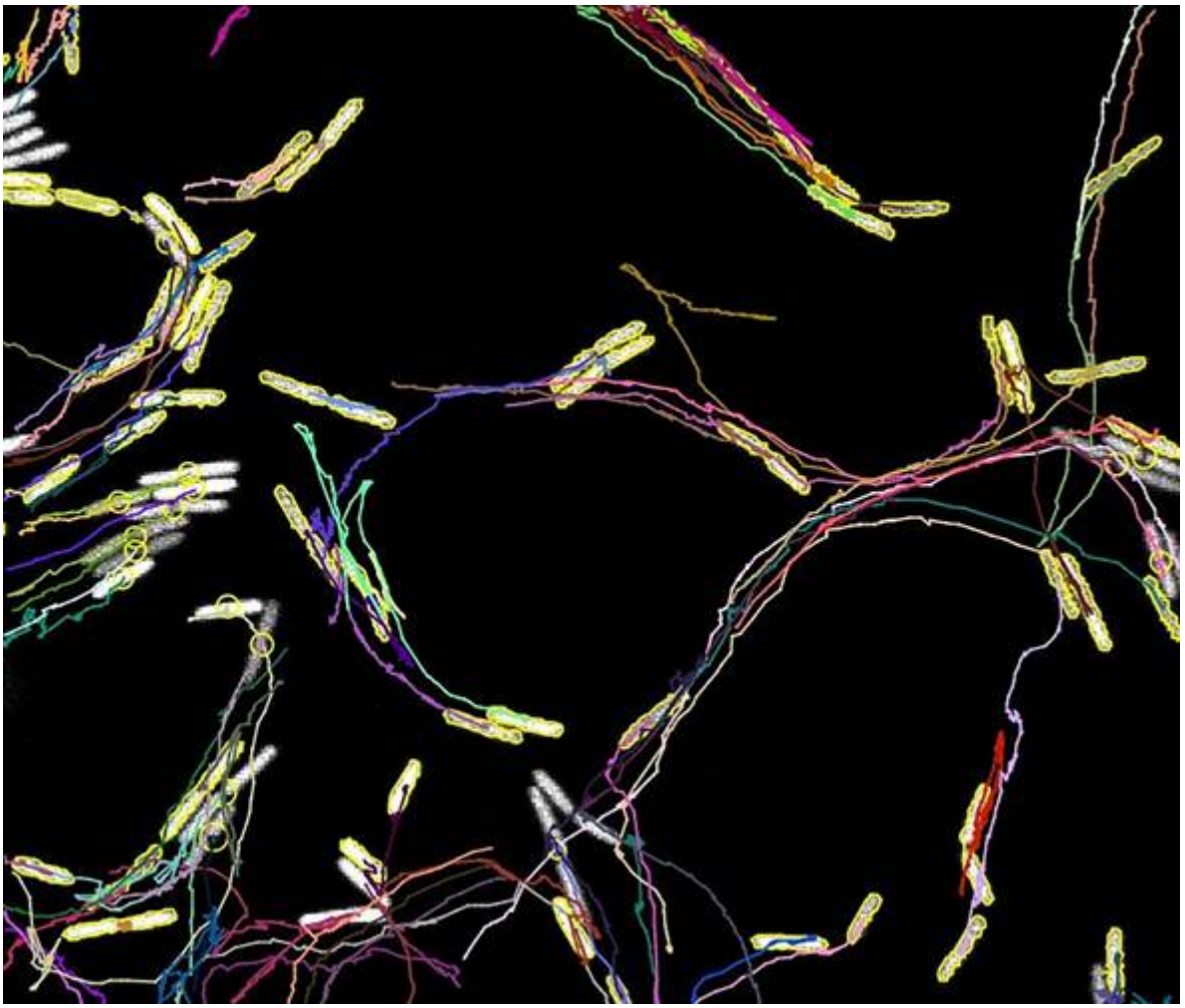

Foto: Se hace camino al andar. Celeste Dea. 1er puesto. Concurso fotográfico SAMIGE 20 años.

PHENOLOGICAL, DEVELOPMENTAL, AND BIOMASS PRODUCTION RESPONSES OF MALTING BARLEY TO Azospirillum argentinense INOCULATION AND THE ROLE OF INDOLE-3-ACETIC ACID

Enrique Casal[1] - Mariana L. Puente[2] - Fabricio Cassán[3] - Gastón López[3] - María V. Criado[1]

1) Cátedra de Microbiología Agrícola. Facultad de Agronomía. Universidad de Buenos Aires. INBA-CONICET-FAUBA. Buenos Aires, Argentina.
2) Instituto Nacional de Tecnología Agropecuaria (INTA), Instituto de Microbiología y Zoología Agrícola, Buenos Aires, Argentina
3) Laboratorio de Fisiología Vegetal y de la Interacción Planta-Microrganismo. Facultad de Ciencias Exactas, Físico-químicas y Naturales. INIAB- CONICET. Universidad Nacional de Río Cuarto, Córdoba, Argentina
Contacto: puente.mariana@inta.gob.ar

It is widely known that physiological processes involved in cereal development and growth are crucial for determining yield through biomass accumulation. Given the increasing use of microbial inoculants in winter crops, this study explores the influence of the inoculation wih *Azospirillum argentinense* Az39 on the phenological development and growth of barley plants (*Hordeum vulgare* L. var. Andreia) and assesses the resulting effects on yield and its numerical components. Furthermore, considering that one of the most important mechanisms of this strain is the production of the auxin indole-3-acetic acid (IAA), we also examine the role of this phytohormone in these responses. For this purpose, barley plants were grown in pots (3 plants per pot) in a FAUBA greenhouse using a tindalized soil:vermiculite (3:1) substrate, and three treatments were applied: i) control (non-inoculated), ii) inoculated with Az39 strain (10^6 CFU/seed), and iii) inoculated with Az39 ipdC- strain (10^6 CFU/seed), a variant of the wild-type strain that does not produce IAA. During the growing cycle, the appearance of leaves and tillers, the onset of anthesis, leaf area, and, after physiological maturity, the dry weight of the aerial biomass and the number and weight of grains in the main stem and primary and secondary tillers were recorded. We observed that Az39-inoculated plants reduced the time to anthesis, completed their vegetative phase with a faster phyllochron, and developed more leaves on the main stem compared to Az39 ipdC- and control plants. Additionally, the main stem leaf area was slightly larger in Az39-inoculated plants and smaller in ipdC- plants. Tillering dynamics were also modified, resulting in a redistribution of dry weight among tiller types, with Az39-inoculated plants showing enhanced development of main stems and primary tillers at the expense of secondary tillers, without altering the final tiller number. This biomass redistribution allowed Az39-inoculated plants to allocate more biomass to grain production in main stems and primary tillers, leading to increased grain number (+4%) and individual weight (+2.2%) and higher yield (+6.5%) and grain quality.

This seems to be compensated by a reduced assimilate partitioning to grains produced in secondary tillers, which showed decreased total weight (-7.1%) and number (-2%) in Az39-inoculated plants compared to other treatment. In conclusion, inoculation with *A. argentinense* Az39 improved barley´s foliar and phenological development and modified biomass partitioning among tillers, resulting in increased yield and quality. These differences were due, at least in part, to the influence of bacterial IAA on barley phenology. Understanding and promoting the relationships between microbiota and plants is fundamental for the proper management of sustainable agroecosystems.

Palabras clave: Az39 - Hordeum vulgare – phenology - IAA