United States Department of Agriculture

NCCC-212 State Report 2021 – USDA, Beltsville, MD, Lewers

CONFIDENTIAL PLEASE

1.

Strawberry

Strawberry Crop Improvement through Genomics, Genetics, and Breeding.

Kim Lewers, Janet Slovin, USDA, Beltsville, MD.

Objective 1; Objective 2; Objective 3;

Dissemination of results: Virtual presentations at The Fruit and Vegetable Growers Association of Delaware, Fruit Session, and The North American Strawberry Growers annual meeting. Patent application for a new cultivar, Cordial.

Plans for next reporting period: Publication on 'Cordial' in HortScience is accepted and waiting on a patent number. Two nurseries received runners of 'Cordial' under MTRAs. We will apply for a patent on another new "short-day"cultivar and submit a manuscript to HortScience. We will test two "dayneutral" selections in other environments.

Joint Strawberry Breeding.

Kim Lewers, USDA, Beltsville, MD; Vance Whitaker, UFL, Wimauma, FL.

Objective 1; Objective 3;

Dissemination of results: None at this time.

Plans for next reporting period: Share pollen, make crosses, share resulting seed, evaluate resulting seedlings.

Developing an Integrated Approach to Combat Gray Mold in Strawberries.

Kalpapatha Melmaiee, Delaware State Univ., Dover, DE; Kim Lewers, USDA, Beltsville, MD.

Objective 1;

Dissemination of results: None at this time.

Plans for next reporting period: Correlate molecular data with proportion rotted fruit.

Determining powdery mildew resistance mechanism in an octoploid strawberry breeding selection.

Kim Lewers, USDA, Beltsville, MD; Xiao Shunyuan and Ying Wu, UMD, College Park, MD.

Objective 1;

Dissemination of results: None at this time.

Plans for next reporting period: To wound and directly challenge leaves of the selection, one of its parents, and a highly susceptible cultivar in order to determine the degree of "resistance" compared with field observations. To elucidate inheritance of "resistance" by observing powdery mildew development among progeny of 1) self-pollinations of the resistant selection, 2) self-pollinations of its parent, 3) cross pollinations between the selection and its parent, and 4) cross pollinations between the selection and 11 other genotypes.

Defining a strawberry idiotype for indoor commercial production.

Kim Lewers, USDA, Beltsville, MD; John Paul Boukis, Shardendu Singh, AeroFarms,

Objective 1; Objective 2; Objective 3;
Dissemination of results: None at this time.
Plans for next reporting period: To observe performance of multiple breeding selections and cultivars in an indoor environment developed and used by AeroFarms.

2.
'Cordial' our most recent cultivar is a late-season "short-day" cultivar with very high yield and large firm, tough fruit with good shelflife. Patent applied for, it is not yet for sale.

'Keepsake' is a mid-season "short-day" cultivar for sale at several nurseries in the US and Canada. A Canadian patent application is being prepared for sales in Canada. It performs better than expected in Canada and the northern US. It prefers an earlier planting and higher nitrogen fertility.

'Flavorfest' is our most established recent "short-day" cultivar, for sale widely. In some locations and from some sources, 'Flavorfest' plants have shown susceptibility to a type of *Phytophthora*.

Colletotrichum siamense in the gloeosporioides group is well ensconced in our seedling and replicated trial fields. I hope to collect segregation data this fall and before *Neopestalotsiopsis* arrives in our seedling fields.

For two harvests the first week of June, fruit from all cultivars and selections showed some level of anthracnose frit rot caused by *Colletotrichum nymphaeae* of the accutatum group. Cultivars that never before showed anthracnose fruit rot had 20%-50% losses that week, with no losses the week before or after.

3.
Publications:

Dhanushka Udayanga, Shaneya D. Miriyagalla, Dimuthu S. Manamgoda, Kim S. Lewers, Lisa A. Castlebury. 2021. Molecular reassessment of diaporthalean fungi associated with strawberry with *Paraphomopsis obscurans* gen. et comb. nov. (Melanconiellaceae), the cause of leaf blight. Mycologia 12(1):1-21.