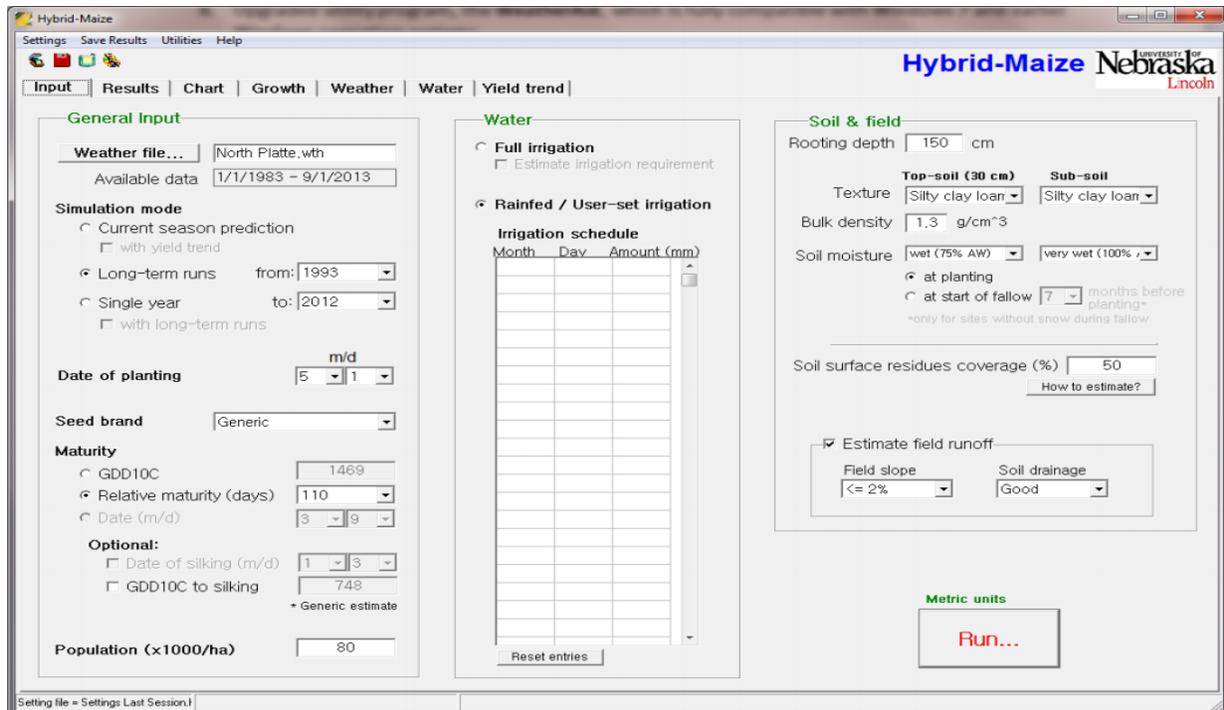**New features in Hybrid-Maize version 2016** (see User Manual for details. The new features are illustrated with screenshots on the following page and associated text in the designated sections in the User Manual)

Motivation for updating the Hybrid-Maize model was to improve its capability to simulate maize yields under water-limited conditions, and the availability of good data to validate performance of these modifications from field studies that experienced severe drought, especially during the U.S. Corn Belt drought of 2012.

1. Inclusion of crop stages in output (Fig. 1, Section 4.1.4)
2. Improved simulation of the impact from water stress on leaf area expansion and senescence (Fig. 2, Section 4.1.5)
3. Improved simulation of soil water balance due to:
    a. Inclusion of field runoff estimation based on field slope, soil hydraulic properties that govern drainage, and degree of surface coverage by crop residues (Fig. 2, Section 4.2.5).
    b. Inclusion of effect of crop residue cover on soil evaporation (Fig. 2).
    c. Option of estimating soil moisture at planting by tracking soil water balance during pre-planting fallow period (Fig. 3, Section 4.2.6)
    d. Modified simulation of soil evaporation (Section 4.2.3)
4. Improved simulation of kernel setting (Section 4.1.9) under drought conditions
5. Improved simulation of root depth penetration and root length distribution (Section 4.1.7)
6. Overall improved simulation under drought conditions (Fig. 4)
7. Option of using alfalfa- or grass-referenced ET in weather data (Section 2.3.2.1)
8. Simulations using input settings in Excel spreadsheet (Fig. 5, Section 3.5)
9. Compatible with Windows 10 and earlier Windows operation systems
10. Upgraded utility program, the WeatherAid, for compatibility with Windows 10
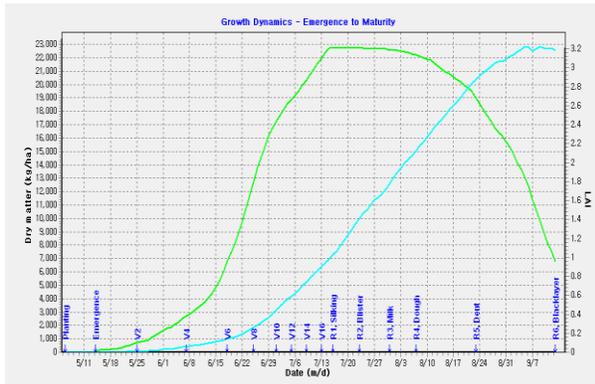
Fig. 1. Crop stages (text in blue) as part of model outputs.
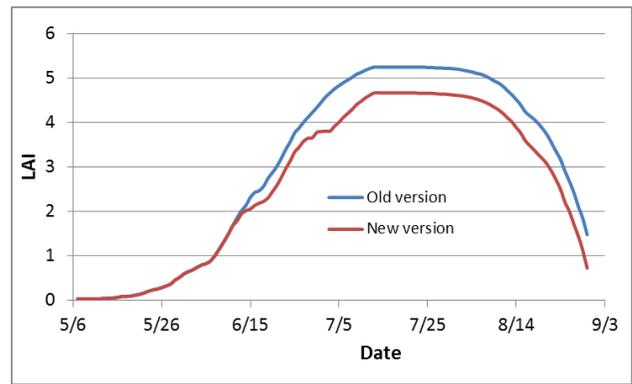

Fig. 2. New version vs old version of simulated leaf area index under water stress

Fig. 3. User input settings for estimating soil moisture status at planting by tracking soil water balance in the pre-planting fallow period.
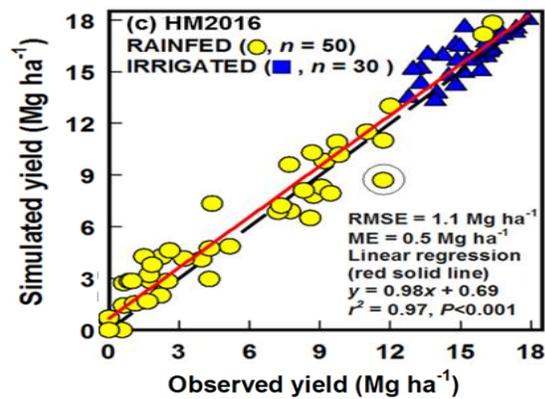

Fig. 4. Simulated *vs.* measured corn yield under irrigated as well as rainfed conditions in the US Corn Belt.

Fig. 5. Simulations using input settings from Excel file