

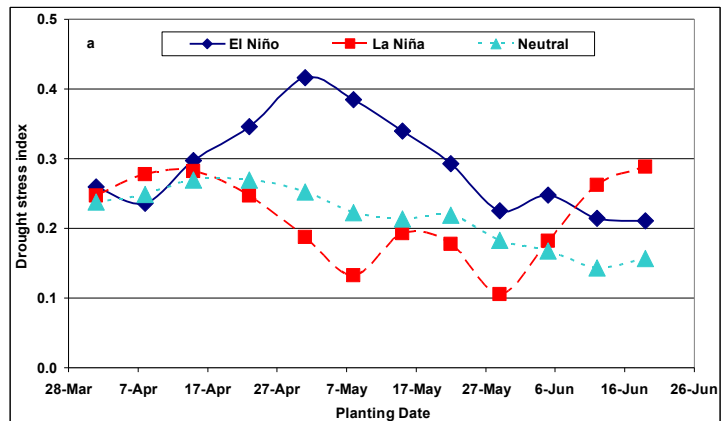
ENSO Influence on Optimal Corn Planting Dates in NC

THE NEED

Historically, NC growers have planted corn from late March through early May. Recently, however, corn has been genetically modified to increase resistance to herbicides and pests. These transgenic corn hybrids protect against late-season insect outbreaks and thus, give producers the chance to plant later in the season (Van Duyn 2008). However, this might have other unintended consequences such as affecting the risk of drought stress during the critical pollination and grain-setting period of corn growth, which occurs around the time of silking (flowering). El Niño Southern Oscillation (ENSO), a phenomenon in the equatorial Pacific Ocean, has an influence on precipitation patterns in the Southeast US and thus, might have an impact on the critical period of corn growth. This need was realized during a March 2009 workshop for agricultural specialists which was funded by the Southeast Climate Consortium.

SERVING THE NEED

Daily growth and drought stress simulations were performed for 12 different planting dates using the CSM-CERES-Maize crop model and 60 years of historical climate data. Results indicate that planting as early as possible or waiting until June during an El Niño event reduces the risk of drought stress during the critical growth period for corn. On the converse, planting in May of a La Niña year appears to decrease risk of drought stress during this crucial period. In Neutral years, planting during mid-May to early June reduces risk. These differences are mainly attributed to differences in July precipitation patterns during the 3 phases of ENSO.



Average simulated drought stress during the 13-day period centered on silking (0 = no stress, 1 = maximum stress) for the mid-maturity corn hybrid in Washington County, NC using JMA ENSO data from 1950-2009.

IMPACT

Use of this guidance could be economically valuable to growers. Drought stress during any stage of corn growth can result in reduced yields and economic loss, but the most sensitive stage for drought stress is silking. Drought accompanied by high temperatures during the silking stage can produce 100% yield loss according to Heiniger 2001. Guidance regarding optimal corn planting dates in NC can reduce the risk of such drastic yield losses. Also, studies have shown that corn yields in the Southeast US are lower than average during El Niño years and are higher than normal during La Niña events (Hansen et al. 1998; Dinon, 2011; Dinon et al. 2011; Martinez et al. 2011; Royce et al. 2011). Thus, information about the

influence of ENSO phase on planting date can be utilized to lessen the negative impacts of El Niño and increase the positive effects of La Niña.

PARTNERS & SUPPORT

Climatic and crop yield data were used to create this climate service. Sources of data include COAPS, NOAA's CPC, NOAA's ESRL, JMA, and USDA. This guidance is offered in close collaboration with faculty at NC State University; the Corn Growers' Association of North Carolina, Inc.; Pioneer Hi-Bred International, Inc.; and the Southeast Climate Consortium (SECC).