



Plant Diseases

Understanding the risk of soybean rust in Texas for soybean production in Iowa

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Last year, soybean rust was found in Texas in early November—a significant finding because this region has been a source for rust diseases of other crops, such as wheat. It is commonly considered that windborne spores are likely to move more efficiently to northern soybean production regions from Texas than from southeastern regions (Florida and Georgia). However, soybean rust differs from wheat rust in a growing season, and therefore, its risk has not been calculated previously. In this article, we provide our modeling results to assess one important early factor: the potential for spore production in Texas early in the season using historical climate data.

In Texas, major soybean production areas are not far from the south-central coast area. We used our climate-based models to predict the potential for spore production in early to mid-season for that region. We aimed to define regions where the climate is more favorable for rust to develop and the frequency of years a higher production of spores would be likely. We assumed that rust developing in a field with severity more than 20 percent would produce a high number of spores for dispersal.

Our models showed that if soybean rust is found in late April, there is a low risk for disease to reach high severity levels (>40%) in soybean areas in the month of May (a 3-in-10-year event). Before May, kudzu will be the major host plants and soybeans are just planted there. The ability of kudzu plants to produce rust spores in that area is unknown. From May to June, the chance for the disease to reach severity levels more than 20 percent is a 5-in-10-year event. So the month of June seems more favorable for disease development in Texas (Figure 1). July is unfavorable for rust development due to low rainfall in the south-central coast region, so the chance of reaching more than 20 percent severity is only a 2-in-10-year event (Figure 2). July generally is not good for rust development because of high temperatures.

From this preliminary calculation, we found that the climate is favorable for rust to establish and produce a high number of spores in southern Texas soybean fields earlier in a season (May and June). If rust is found there, close monitoring of the disease, together with seasonal climate and disease outlooks in April and May, will help to assess the risk to northern states. If disease is found there in late June, the climate in July is less favorable for rust to develop (and produce spores), which means less spore production in Texas during the major soybean growing season in Iowa. The chance for the disease to move to Iowa directly from Texas should be lower than wheat rust. We should assess the risk of the disease outbreak during the season together with two other factors: conditions that lead to spore dispersal and establishment in Iowa.

In summary, the recent confirmation of soybean rust present in Mexico and in southern Texas is significant because it increases the risk of northward movement compared with last spring. However, movement of soybean rust from that region depends on two events: (1) development of disease before July in that region and (2) northward spore movement from southern Texas. The movement, if it happens, is more likely a step-by-step event in a season other than one long leap from Texas to Iowa. In the next newsletter, an analysis on dispersal potential from Texas to the North Central Region will be provided.

As of April 1 in Texas, a sentinel plot planted March 9 and monitored in San Patricio County has no rust, nor does kudzu in Liberty County. As for this year, a midterm prediction of a drier than normal summer further reduces the risk.

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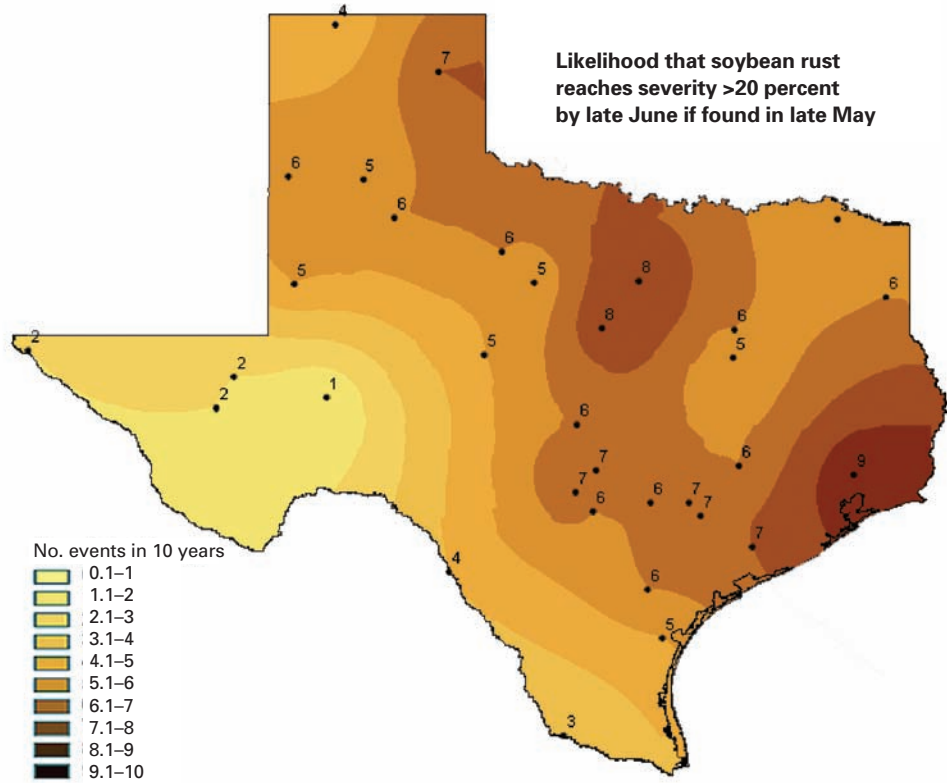


Figure 1. Climate favorability for rust development in June.

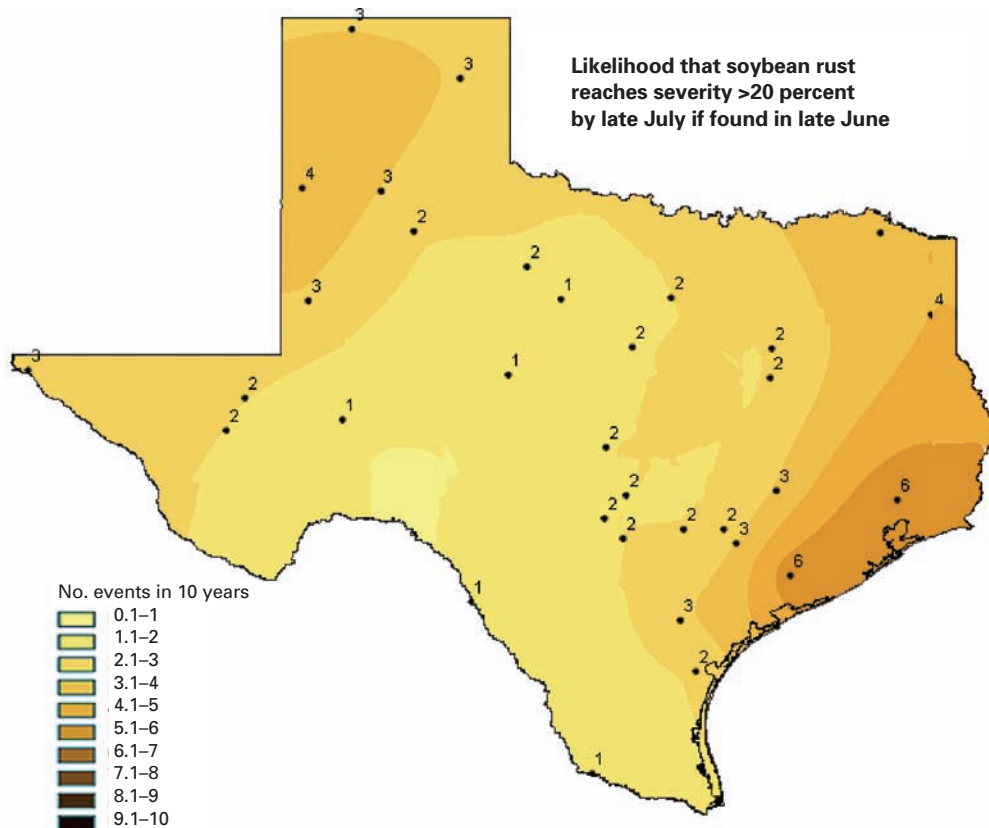


Figure 2. Climate favorability for rust development in July.