Biophysical Simulation of Wheat and Soybean to Assess the Impact of Timeliness on Double-Cropping Economics

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In recent years, the double cropping of wheat (Triticum aestivum L.) and soybean [Glycine max (L.) Merr.] has been a popular enterprise for producers in the southern USA. Between 1982 and 1986, the proportion of total soybean acreage that was double cropped was 24% in Arkansas, 39% in Georgia, 33% in North Carolina, and 36% in South Carolina (Arkansas Agricultural Statistics Service, 1987). Smaller, but nevertheless significant, proportions of soybean acreage were also double cropped in Louisiana and Mississippi (9 and 14%, respectively) during the same period. A double-cropped system ideally begins with winter wheat seeded in mid to late October and harvested by early June. Soybean is then planted to the same acreage and harvested in autumn resulting in two crops per acre per year. Typically, the benefits of double cropping, in comparison with full-season soybean, consist of the additional net returns from the wheat crop and the improved cash flows, which accrue to the producer in June at wheat harvest.

In spite of these advantages, there is a potential increase in risk to the producer with a double cropped system. Any delays in the wheat harvest will subsequently delay soybean planting and increase the probability of reduced soybean yields due to the diminished photoperiod with the later plantings. The Arkansas Cooperative Extension Service (CES) recommends early soybean planting to avoid yield losses of 2%/d for soybean planted between 15 June and 1 July, and even greater losses of 2.5%/d after 1 July (Nester, 1983). These recommendations are based on research that found that early maturing soybean varieties (Group V) attain highest yields if planted in early June, compared with midseason and late midseason varieties (Groups VI and VII) whose yields are highest with mid- to late-June plantings (Caviness & Thomas, 1979). Since virtually all wheat in Arkansas is double cropped, the average date of wheat harvest provides one indication of the approximate date of double-crop soybean planting in the state. On average, only 3% of winter wheat acreage was harvested by 1 June compared with 40%