

Days Suitable for Fieldwork in Missouri

Department of Agricultural Economics

The number of days available to complete land-based agricultural activities influences decisions about inputs (e.g., variety/hybrid planted, pesticide used) and machinery. Limited fieldwork days during critical times, such as tillage, planting and harvest, require careful management.

A large machinery complement will complete fieldwork quickly but can increase ownership costs. A small machinery complement may have less ownership cost but cause delays of some key activities that affect productivity. The size of machinery that can efficiently complete the necessary activities depends on how many days it can actually be used in the field.

The Missouri Agricultural Statistics Service (MASS) reports the number of days each week that soil and moisture conditions are suitable for fieldwork. These data start around the first week of April. Historically, this has been early enough to cover the usual corn planting dates of mid-April to mid-May. However, corn planting has been occurring much earlier in recent years. The USDA reported 46 percent and 50 percent of corn was planted by mid-April (April 16) in 2005 and 2006, respectively. Unfortunately, no data exist for days suitable for fieldwork before April in Missouri.

Figure 1 shows the distribution of fieldwork days for the 60-calendar-day periods of April/May and September/October. Use the graph by selecting the number of days that you would like to have available for fieldwork. Draw a straight line up. When your line intersects either the April-May or Sept.-Oct. plots, draw a straight line left to the axis labeled "Probability." The result is the percentage of time that you could expect the desired number of fieldwork days to be available. For example, 35 fieldwork days or more occur about 30 percent of the time during the April-May period. That means that 70 percent of the time you will not have the 35 fieldwork days you want.

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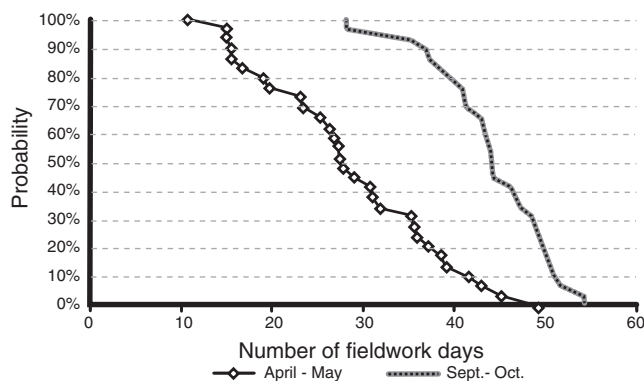


Figure 1. Probability of weather favoring completion of fieldwork in Missouri within a specified number of days during an April-May period and a September-October period.

Table 1 summarizes the average number of weekly fieldwork days from 1977 to 2006 in each of the nine MASS reporting districts. The actual number of suitable fieldwork days varies considerably from year to year. Estimates are for seven-day workweeks. If fieldwork will not be done every day of the week, adjust the data by multiplying by the fraction of the week that will be worked, such as $\frac{6}{7}$ or 0.857 for a six-day workweek. Figure 2 shows the weekly averages for each district with a trend line to smooth out the weekly variability.

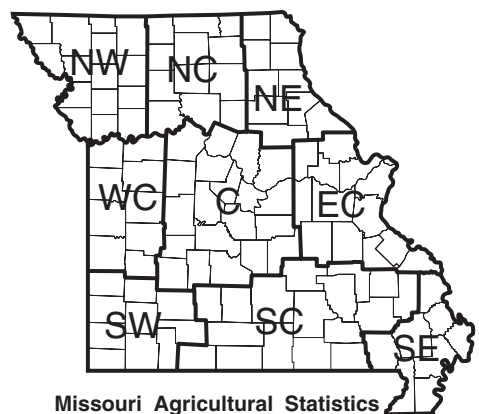
After you have found the average number of days that you can expect to be able to perform fieldwork, the minimum necessary daily machinery capacity can be computed. For example, in southeast Missouri between April 3 and April 16 you can expect 6.6 days (3.1 + 3.5 days) suitable for fieldwork during that two-week period. If you have 1,000 acres of corn to plant, you need to be able to plant $1,000 \div 6.6 = 151$ acres per day to finish within two weeks under average circumstances. If the planter can be operated 14 hours per day, a planter large enough to plant 10.8 acres/hour is needed ($151 \text{ acres} \div 14 \text{ hours}$).

Because these data are annual averages, the above example implicitly assumes a completion rate of about 50 percent. This means that in about half the years less than 1,000 acres can be planted in the two-week period. This level of risk may not be acceptable to all operators.

A spreadsheet calculator is available online to further refine machinery size decisions and evaluate the

chance of inadequate time to complete fieldwork. The calculator computes the probability that work can be completed for specific cropping activities and defined time periods in any region of the state. Users can quantify how a change in machinery size or crop acreage

affects the risk of not completing the work. Download the spreadsheet entitled “Missouri Days Suitable for Fieldwork” from the University of Missouri Food and Agricultural Policy Research Institute (FAPRI) at fapri.missouri.edu.



Missouri Agricultural Statistics Service reporting districts.

Table 1. Average number of days per week suitable for fieldwork in Missouri.

Week beginning	Missouri Agricultural Statistics Service reporting districts									Missouri state	
	NW	NC	NE	WC	C	EC	SW	SC	SE		
Mar 27	2.1	1.6	1.6	2.9	2.8	2.0	4.1	3.7	2.8	2.8	
Apr 03	3.5	3.1	3.0	3.2	3.4	2.8	4.2	4.1	3.1	3.4	
Apr 10	3.3	3.3	3.1	3.3	3.5	3.3	4.1	4.3	3.5	3.5	
Apr 17	3.2	2.8	2.8	3.3	3.3	3.3	4.3	4.2	3.7	3.4	
Apr 24	3.3	2.8	2.7	3.4	3.4	3.3	4.1	4.2	3.4	3.3	
May 01	3.2	2.9	3.2	3.2	3.5	3.4	4.0	4.1	3.2	3.3	
May 08	3.1	2.8	3.1	3.2	3.4	3.5	4.2	4.1	3.5	3.3	
May 15	3.6	3.1	3.9	3.3	3.5	3.5	4.0	4.3	4.0	3.5	
May 22	3.6	3.4	3.7	3.5	3.9	4.1	4.2	4.6	4.3	3.9	
May 29	3.5	3.5	3.3	3.5	4.0	3.9	4.5	4.5	4.1	3.8	
Jun 05	4.0	3.7	3.9	3.6	4.0	4.2	4.5	4.6	4.4	4.0	
Jun 12	4.3	3.8	4.0	4.0	4.1	4.2	4.6	4.8	4.5	4.2	
Jun 19	4.5	4.6	5.0	4.6	5.0	5.1	5.1	5.4	5.3	4.9	
Jun 26	4.7	4.6	5.0	4.5	5.0	5.1	5.0	5.4	5.2	4.9	
Jul 03	4.8	4.8	5.0	4.8	6.3	5.0	5.1	5.3	4.7	4.9	
Jul 10	4.6	4.7	4.8	5.0	5.0	5.0	5.6	5.5	5.0	4.9	
Jul 17	5.1	5.0	5.2	5.5	5.5	5.5	6.0	5.8	5.6	5.4	
Jul 24	4.9	4.9	5.0	5.3	5.3	5.2	5.7	5.7	5.5	5.2	
Jul 31	5.0	5.1	5.4	5.3	5.4	5.3	5.7	5.7	5.1	5.3	
Aug 07	5.4	5.1	6.1	5.5	5.7	5.6	6.0	5.9	5.7	5.6	
Aug 14	4.8	4.7	5.0	5.2	5.2	5.3	6.0	5.8	5.7	5.2	
Aug 21	5.0	4.9	5.0	5.3	5.4	5.5	6.0	5.9	5.9	5.4	
Aug 28	5.1	5.1	5.3	5.3	5.5	5.3	5.9	5.8	5.5	5.4	
Sep 04	5.2	5.2	5.5	5.6	5.6	5.6	6.0	6.0	5.7	5.5	
Sep 11	5.1	5.2	5.4	5.6	5.7	5.6	5.8	5.7	5.7	5.6	
Sep 18	4.5	4.0	4.5	4.6	4.8	5.0	5.3	5.6	5.2	4.8	
Sep 25	5.0	4.8	4.9	5.0	5.1	5.1	5.5	5.6	5.2	5.1	
Oct 02	5.1	5.0	5.0	5.0	5.2	5.3	5.5	5.8	5.6	5.2	
Oct 09	5.0	4.7	4.7	4.6	4.7	4.8	5.3	5.2	5.0	4.8	
Oct 16	4.8	4.5	4.8	4.7	4.9	4.9	5.4	5.5	4.8	4.9	
Oct 23	4.7	4.4	4.6	4.5	4.8	4.5	4.9	5.0	4.4	4.6	
Oct 30	4.0	3.7	4.2	4.0	4.2	4.3	4.7	4.8	4.3	4.2	
Nov 06	3.8	3.6	3.8	4.0	4.1	3.9	4.5	4.7	4.0	3.9	
Nov 13	3.8	3.6	3.7	3.4	3.5	3.2	4.1	4.3	3.6	3.6	
Nov 20	3.5	3.1	3.0	3.0	3.1	2.9	3.6	4.1	3.3	3.2	
Nov 27	3.8	2.4	2.0	2.3	2.3	1.6	2.9	3.0	1.8	2.5	
Dec 04	2.7	2.2	2.4	1.6	1.6	1.8	2.5	2.8	2.1	2.2	
Dec 11	1.1	0.9	0.4	0.9	0.3	0.7	0.6	1.3	1.4	0.9	
Period											Missouri state
From	To	NW	NC	NE	WC	C	EC	SW	SC	SE	
Mar 27	Jun 5	3.3	3.0	3.1	3.3	3.5	3.4	4.2	4.2	3.6	3.5
Jun 5	Aug 28	4.7	4.7	4.9	4.9	5.1	5.1	5.4	5.5	5.2	5.0
Aug 28	Nov 20	4.6	4.4	4.7	4.7	4.8	4.8	5.2	5.3	4.9	4.8

Figure 2. Average number of days suitable for fieldwork in Missouri, by MASS reporting districts.

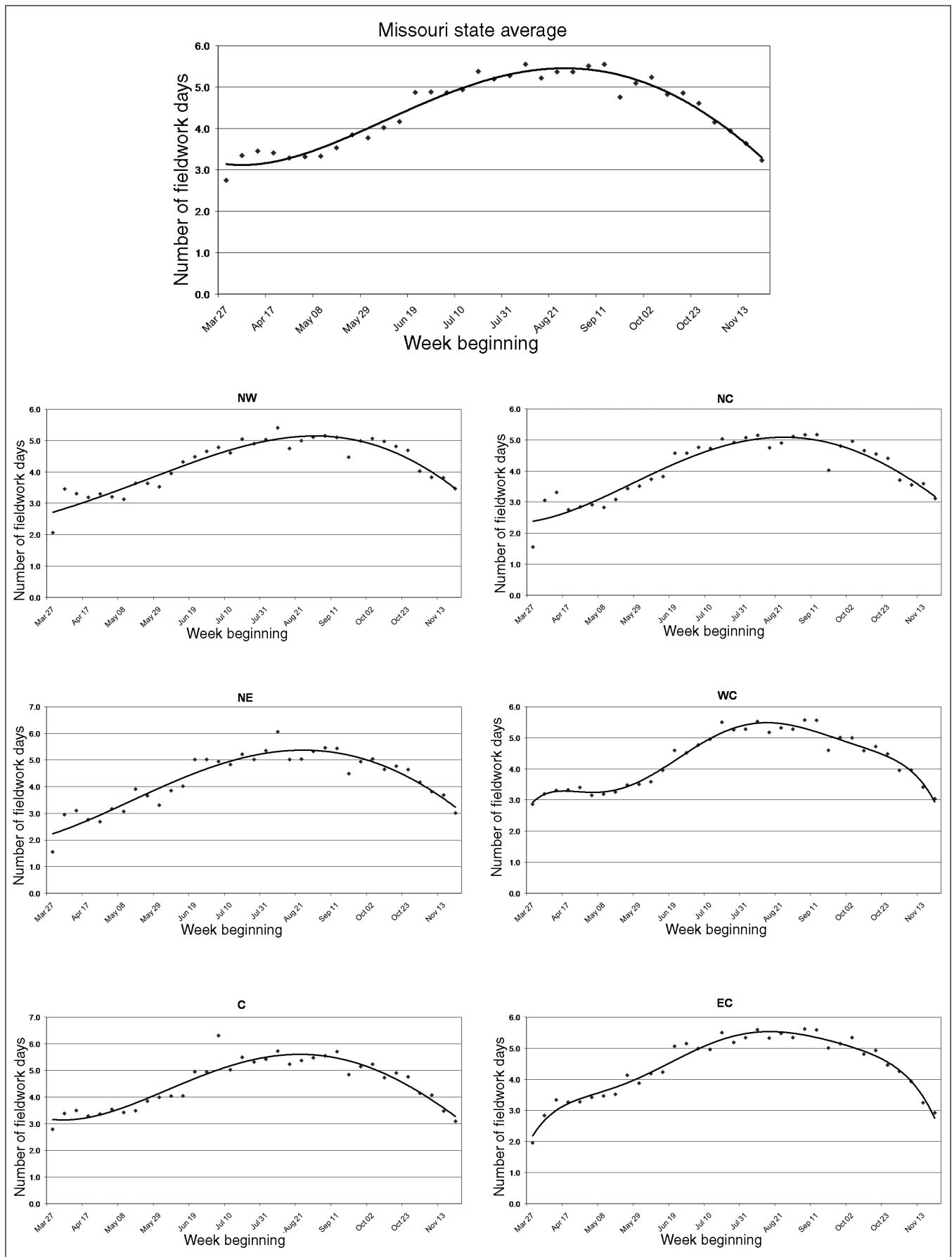
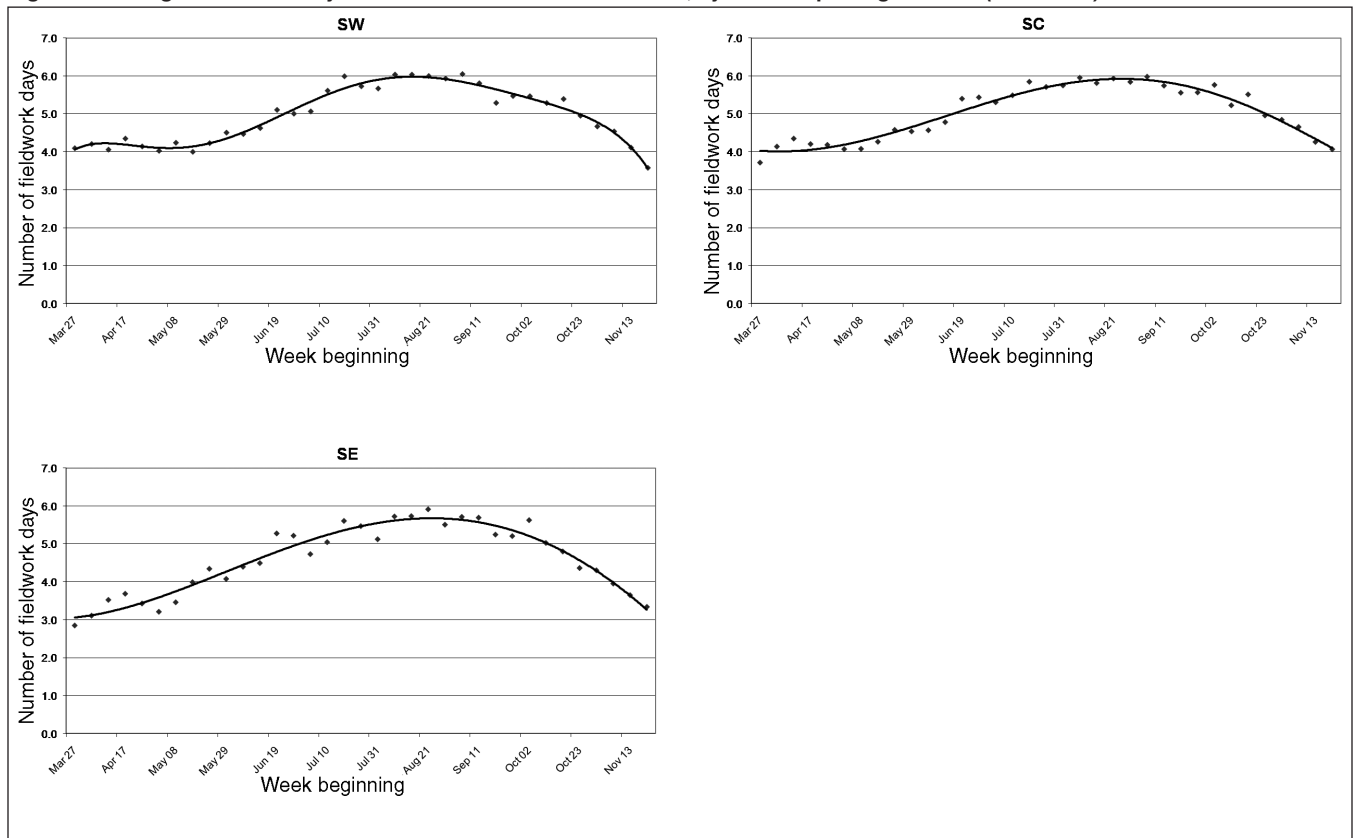


Figure 2. Average number of days suitable for fieldwork in Missouri, by MASS reporting districts (continued).



For further information

Edwards, William. 2002. *Estimating the Number of Field Days Required*. Ag Decision Maker File A3-28. Iowa State University.
 Online: extension.iastate.edu/agdm/crops/html/a3-28.html

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Massey, Raymond. 2007. *Days Suitable for Fieldwork in Missouri*. Agricultural Electronic Bulletin Board, University of Missouri
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