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Wind Speed and Pesticide Applications

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The use of pesticides in the production of farm crops has increased rapidly in Missouri over the past decade. Problems arise when these materials are blown by the wind into nearby fields, pastures, towns or farmsteads. The effect of the wind on the drift is not the same for all pesticides; nor does wind blow the materials from different spray rigs the same distance. This is because spray rigs create different drop sizes during application.

Some simple but useful general statements can be made about the variations in wind speed through the day. In a study of 19 years of records in central Missouri, the average wind speed was calculated by periods of the day. These values are shown in Table 1. In all cases the wind speed is less during darkness, but this is not a safe or convenient time to apply pesticides.

The next general period of the day with slower wind speeds is during twilight. This twilight period includes both early morning and evening hours, and the period is the transition between the slow wind speeds of the night and the faster and more gusty winds of the daytime. These transition hours may offer the best opportunity for pesticide application. Certainly as the day progresses the probability of high wind speeds becomes greater.

Figures 1, 2, 3 and 4 show the per cent of time the wind speed has been less than a particular speed for different times of day and months. These graphs provide a basis for general decisions as to the time of day to apply pesticides. As an example, for a wind speed of 10 miles per hour or 8.7 knots (the knot is a unit of wind speed used in aviation; 1 mile per hour equals 0.87 knots) enter the bottom of the graph and draw a vertical line to the "time of day" of interest. From this intersection a horizontal line drawn to the scale on the left-hand margin shows the percentage chance of a lower wind speed.

In the example from Figure 1 for March and April, a wind speed lower than 10 miles per hour is expected only 30 per cent of the daytime hours, while a wind stronger than 10 knots is expected 70 per cent of the hours. Figure 1 indicates that 46 per cent of the twilight hours are expected to have wind speeds below 10 miles per hour, and the per cent of expected occurrence increases to 55 per cent during the hours of darkness. The percentage values refer to the chance of wind speeds below a critical level at a particular time of day.

March and April generally experience the fastest wind speeds within the four time periods considered. July and August have the lowest wind speeds. These comparisons can be seen in Table 2 which shows for the twilight period the percentage of time with wind speeds below 5, 10 and 15 miles per hour.

The selection of a wind speed to be used as an upper limit for spraying must be left to the operator, as it is based on the characteristics of the equipment, the risks of contamination, etc. Of prime importance in considering the amount of drift is the rate of fall of the drop, which depends on the drop sizes put out by the spray rig nozzles. The applicator should follow directions on the label of the material being used.

The information on these four graphs is intended to encourage the applicator and the farmer to select times for application which reduce the hazard of drift of the pesticide. In Missouri the application should be made either early in the day or near sundown. Because of the higher wind speeds, more care should be exercised in spring (March and April).

TABLE 1

Average Wind Speed in Miles Per Hour For Different Periods of the Day

Months	Periods of the Day		
	Darkness	Twilight[1]	Daylight
March-April	11 mph	12 mph	15 mph
May-June	8	8	11
July-August	7	7	9
Sept-Oct	8	9	11

[1]Twilight is taken as a two-hour period extending from before to after sunrise and sunset.

TABLE 2

Percentage of Time With Wind Speeds Less Than Indicated Value for the Twilight Interval

Wind Speeds Less Than	Monthly Period			
	Mar-Apr.	May-June	July-Aug	Sept-Oct
5 miles per hr	6%	14%	20%	12%
10 miles per hr	29	48	65	50
15 miles per hr	57	81	92	82

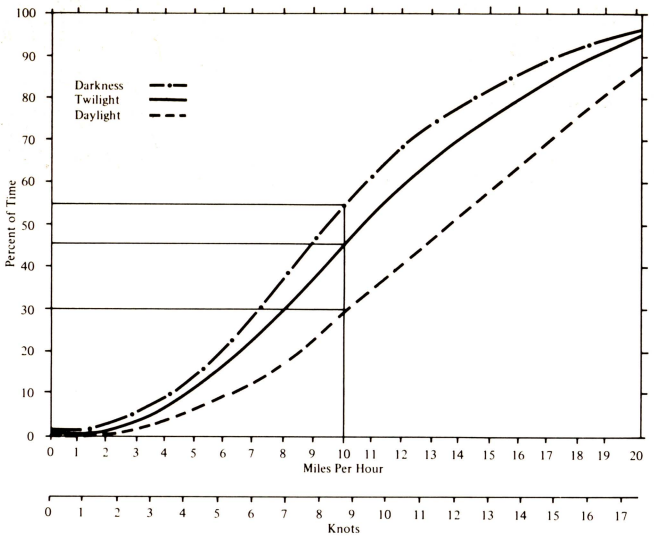

Figure 1. Per cent of Time With Wind Speeds Lower Than Indicated Levels by Daily Period for March and April.

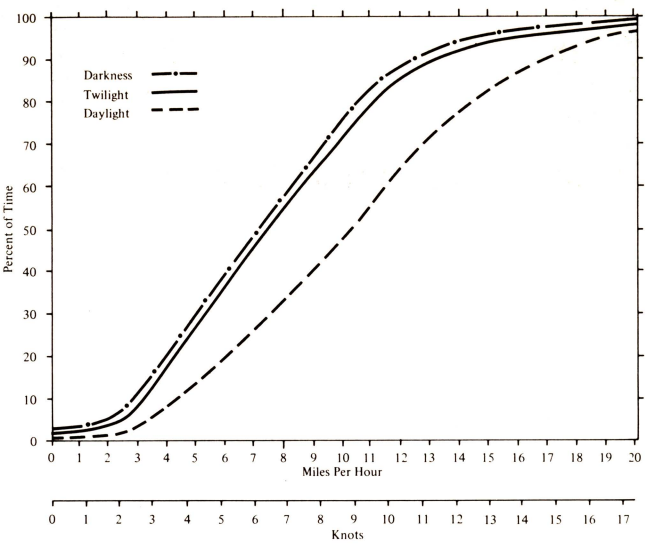

Figure 2. Per cent of Time With Wind Speeds Lower Than Indicated Levels by Daily Period for May and June.

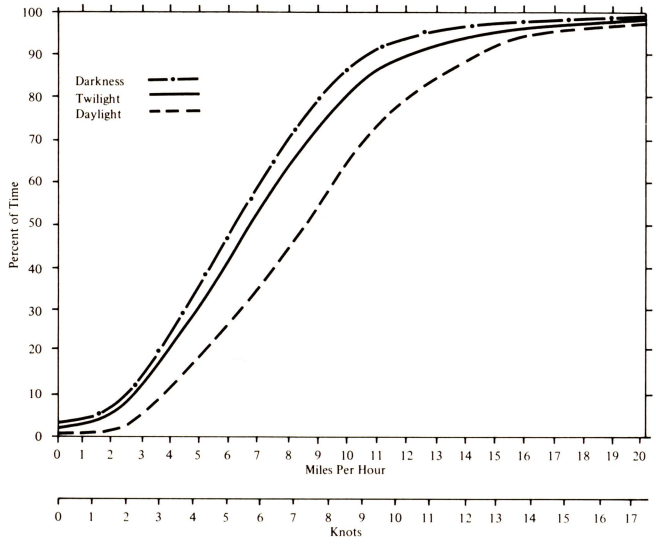

Figure 3. Per cent of Time With Wind Speeds Lower Than Indicated Levels by Daily Period for July and August.

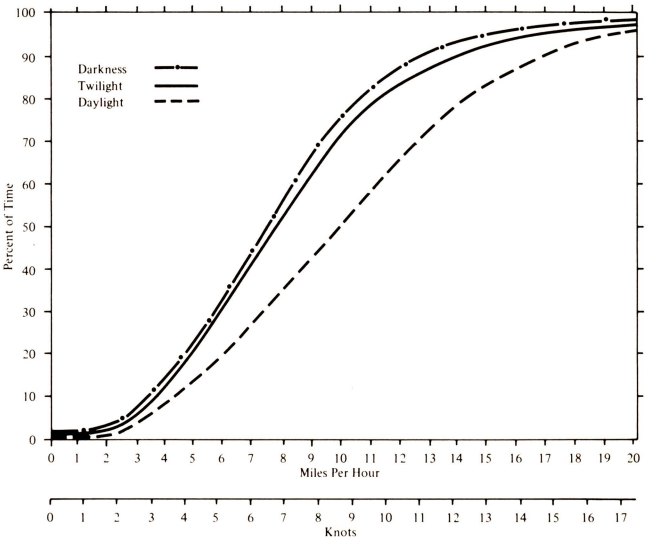

Figure 4. Per cent of Time With Wind Speeds Lower Than Indicated Levels by Daily Period for September and October.

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