L = 3700 ft. The total distance is 2640 ft to field edge, plus the 1200 ft. of field length, or 3840 ft. The woods provide protection for 10% of the height, or 150 ft. So 3840 ft - 150 ft = 3670 ft. rounded up to 3700 ft.

V = 0, since all residue was turned under.

Now refer to the wind erosion tables and figure the loss for March, April, and May. Use the Table for C = 5, I = 134, and K = 1.0. Use L of 4000 ft. (Note that the loss is the same as for L of 3000 ft.) Read under the V = 0 column, a loss of 6.7 tons/ac/yr. This would be the loss if it stayed March all year.

Next, refer to Table 5. The percent of annual EWE for the nearest reporting station, Ft. Bragg, is 20 for March. The loss for March is 6.7 x .20 or 1.34 t/ac.

To figure the April loss, refer to the table for C=10, I=134, and K=1.0. Again, use L of 4000 ft. and under V=0, read 13.4 tons/ac. The percent EWE for April is 14 (Table 5). So 13.4 x .14 = 1.88 tons/ac. for the April soil loss.

To figure the May soil loss follow the same procedure. Use the wind erosion table for C = 3, I = 134, and K = 1. Use L of 4000 ft., V of 0, and read a loss of 4.0 t/ac. The EWE for May is 5, so 4.0 X .05 = 0.2 tons/ac. The total loss for the period March-May is 3.42 tons/acre. (1.34 + 1.88 + 0.2 = 3.42).

b. Refer to Table 6. Note that the tolerance for cotton is 0.25 tons/ac. So the cotton is likely protected.

3. In Tyrrell County a field of Altavista loamy fine sand has residues turned under in late December. Corn is planted around April 1 and the surface is left essentially flat. From an aerial photo, you determine that the unsheltered distance is 1800 ft.

a. What is the soil loss for the period January-May?

<u>Procedure</u>

Determine factors for I, K, C, L, V.

From Table 1, note that I for Altavista loamy fine sand = 134. The K factor will be 1.0 for the entire period. From Table 3, note that C for Tyrrell is 10 for January-April, and 5 for May. The L factor will be 1800 ft.

Since the residue was turned, the V factor will be 0 at least through April. For May, however, give credit for the corn growth estimated at 500 lbs. per acre. Refer to chart 8 to convert 500 lbs. of standing corn to 250 lbs. of flat small grain.

Find the chart for C of 10, I of 134, and 1.0 for K. For January-April, interpolate to get a rate of 13.2 tons/ac. The per cent EWE is 12, 13, 12, and 11, respectively for January, February, March, and April. So, the soil loss is:

13.2 x .12 = 1.6 for January
13.2 x .13 = 1.7 for February
13.2 x .12 = 1.6 for March
13.2 x .11 = 1.5 for April

For May, the rate is 10.7 tons/ac. x .07 = 0.7 tons/ac. So, the total loss is 7.1 tons/ac. for the period.

b. Is the loss in April excessive for the corn?

Procedure

Refer to Table 6. Note that the tolerance for corn is 2.0 tons/ac. Therefore, the loss is not in excess of the crop tolerance.

c. Is the loss excessive for the soil for January-May?

Procedure

Note in soils -5 (blue sheet) for Altavista that the "T" is 5 tons/ac/yr. Thus, the loss is excessive and should be reduced.

d. The landowner agrees to install a windbreak and temporary measure to bring the loss to within "T". What should be the orientation of the windbreak?

Procedure

Refer to table 4. Note that the wind erosion direction is 203°. The most effective barrier is a 90° angle with the wind direction. Thus 203° + 90° = 293°. So the windbreak should be oriented along a line of 293°.

e. Upon closer examination, it is determined that the field is oriented along 260° and the landowner would only place barriers on this angle. What is the maximum field strip width allowable?

Procedure

From "c" above, recall that "T" is 5 tons/ac./yr. A check with the USLE shows a loss of 3 tons/ac./yr. This leaves an allowable wind erosion loss of 2 tons/ac./yr.

Note in 3a that February has the greatest wind erosion loss. (1.7 tons/ac.) This is 24% of the total wind erosion loss. (1.7 divided by 7.1 = 23.9 or 24%). Twenty-four percent of the allowable loss of 2 tons/ac. = 0.48 or 0.5 tons/ac., which is the allowable loss for February. The EWE for February is 13%.

Determine that 3.8 is the soil loss rate of which 13% = 0.5 tons/ac. (0.5 divided by .13 = 3.8). This means that an annual rate of 3.8 tons/ac., when discounted for the 13% of the EWE is the rate to find in the wind erosion table.

Next, select the table for C = 10, I = 134, and K = 1.0. Under the 0 column, find 3.5, then read to the left under unsheltered distance a distance of 100 feet.

Now refer to chart 2. Remember that perpendicular to the prevailing wind direction (203°) is 293° (203° + 90°). Remember also that the field alignment is such that the landowner is not willing to place barriers at right angles, but will place them at 260°. Compute the angle of deviation to be 33° (293° -260° = 33°).

With a straight edge, place one end on scale C at 33 and on scale A at 100 feet. Read 80 feet on scale B. This means that a barrier would need to be placed every 80 feet in order to reduce the wind distance to 100 feet. This would reduce the erosion to "T".

f. Suppose it is desired to keep erosion to zero to protect a sensitive crop. The farmer is willing to plant small grain strips, again on the 260° angle, to accomplish this. How far apart are the strips to be spaced?

Procedure

It has been shown that barriers are able to give full protection to the downwind side for up to 10 x its height provided the angle of deviation is no greater than 22½°.

Assume that the small grain barrier will reach 3 feet tall, which would give a 30-foot protected distance. Again, refer to chart 2. Recall that the angle of deviation is 33°. Place a straight edge on 33 on scale C, on 30 on scale A, and read 25 on scale B. This means that the strips would need to be placed every 25 feet.

Figure I

WIND EROSION CONTROL TERMS ILLUSTRATED

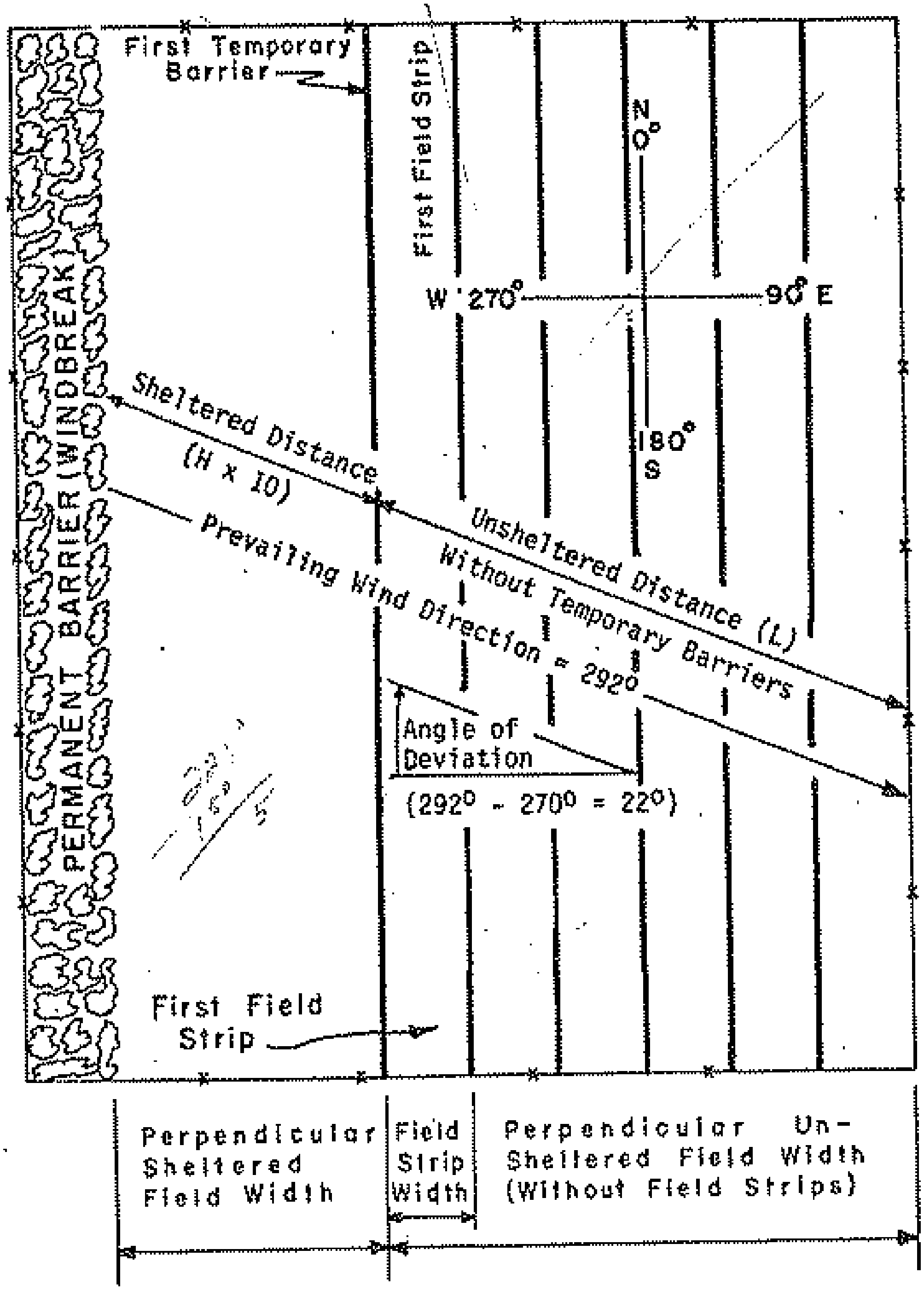
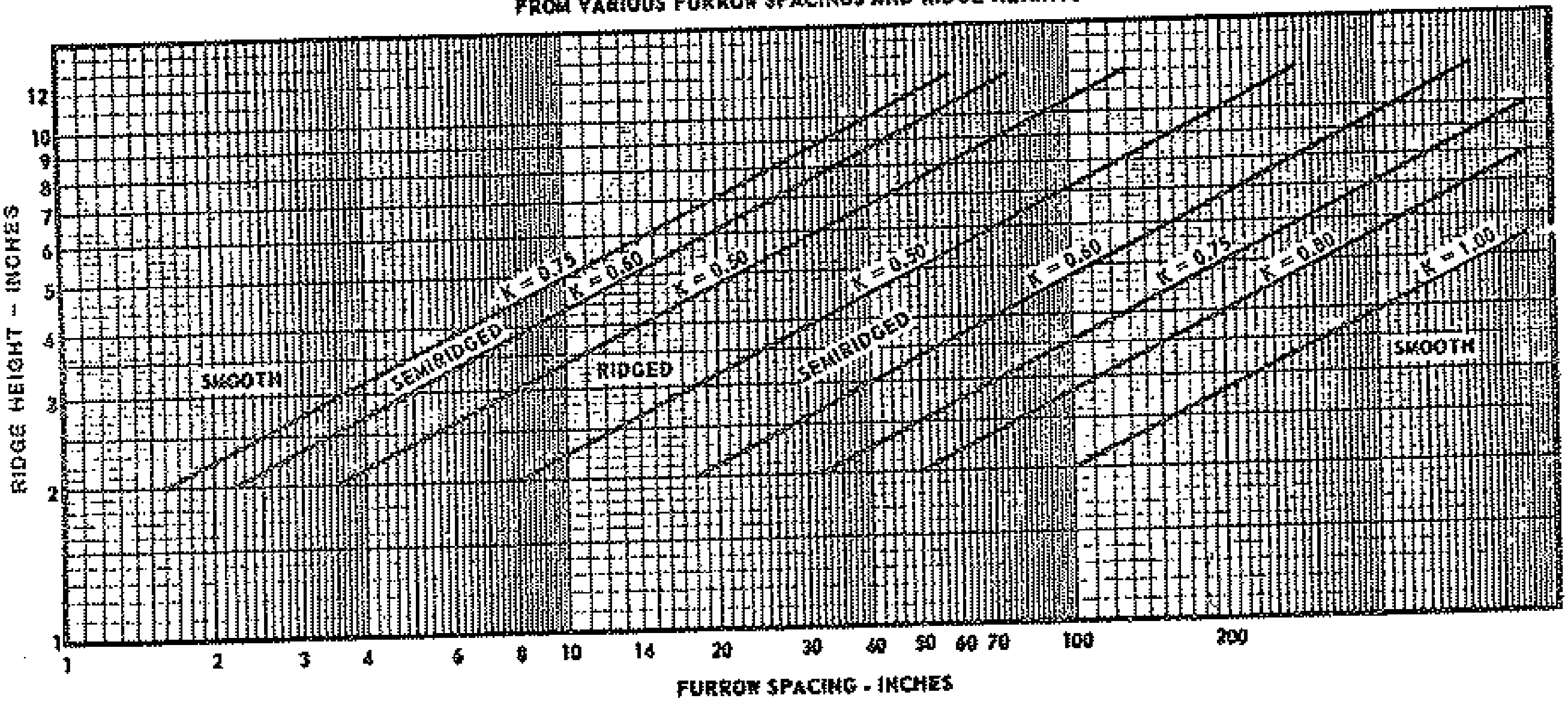


Chart - 1 WIND EROSION RIDGE - ROUGHNESS - "K"
FROM VARIOUS FURROW SPACINGS AND RIDGE HEIGHTS



Source: USDA-SCS

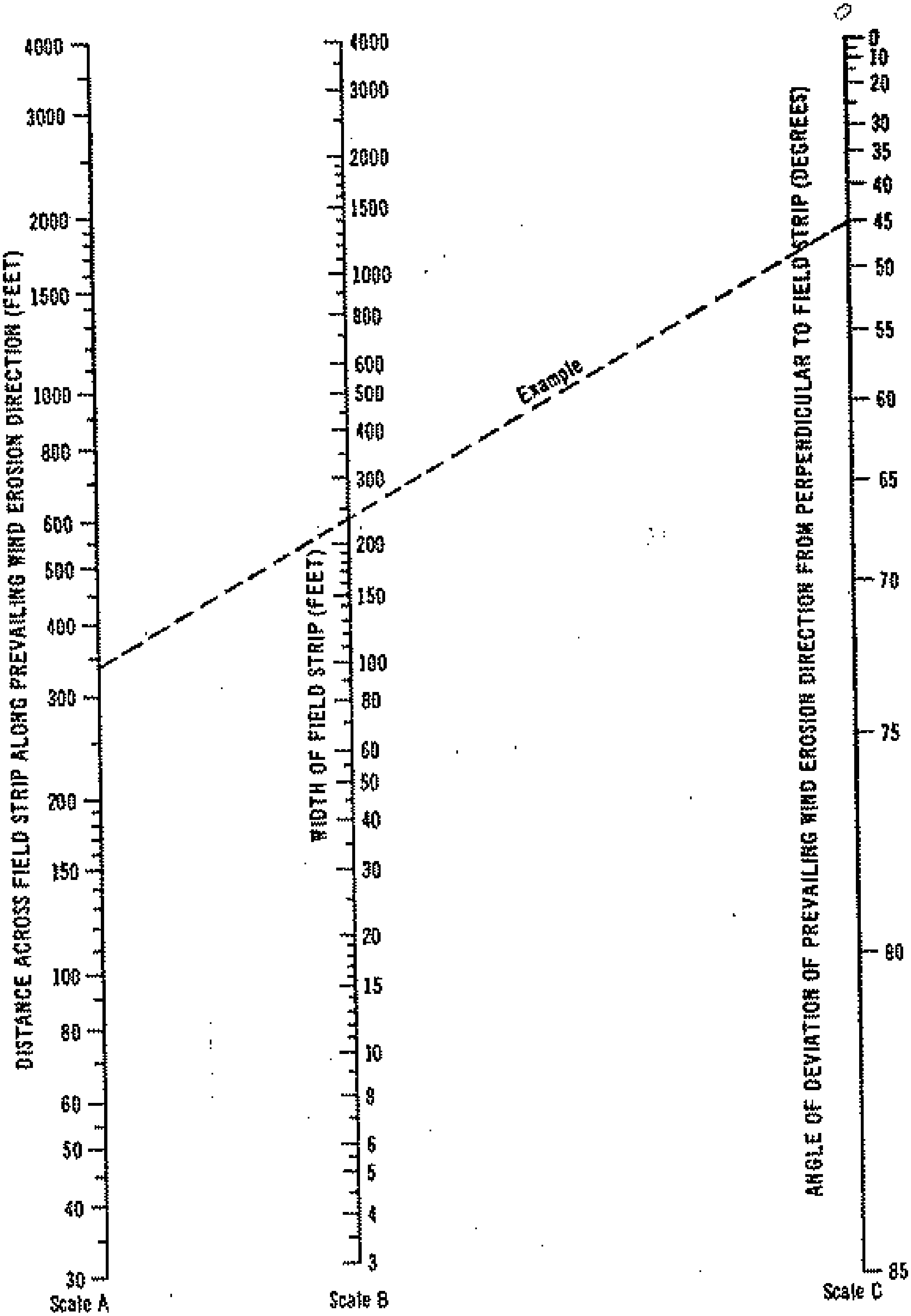
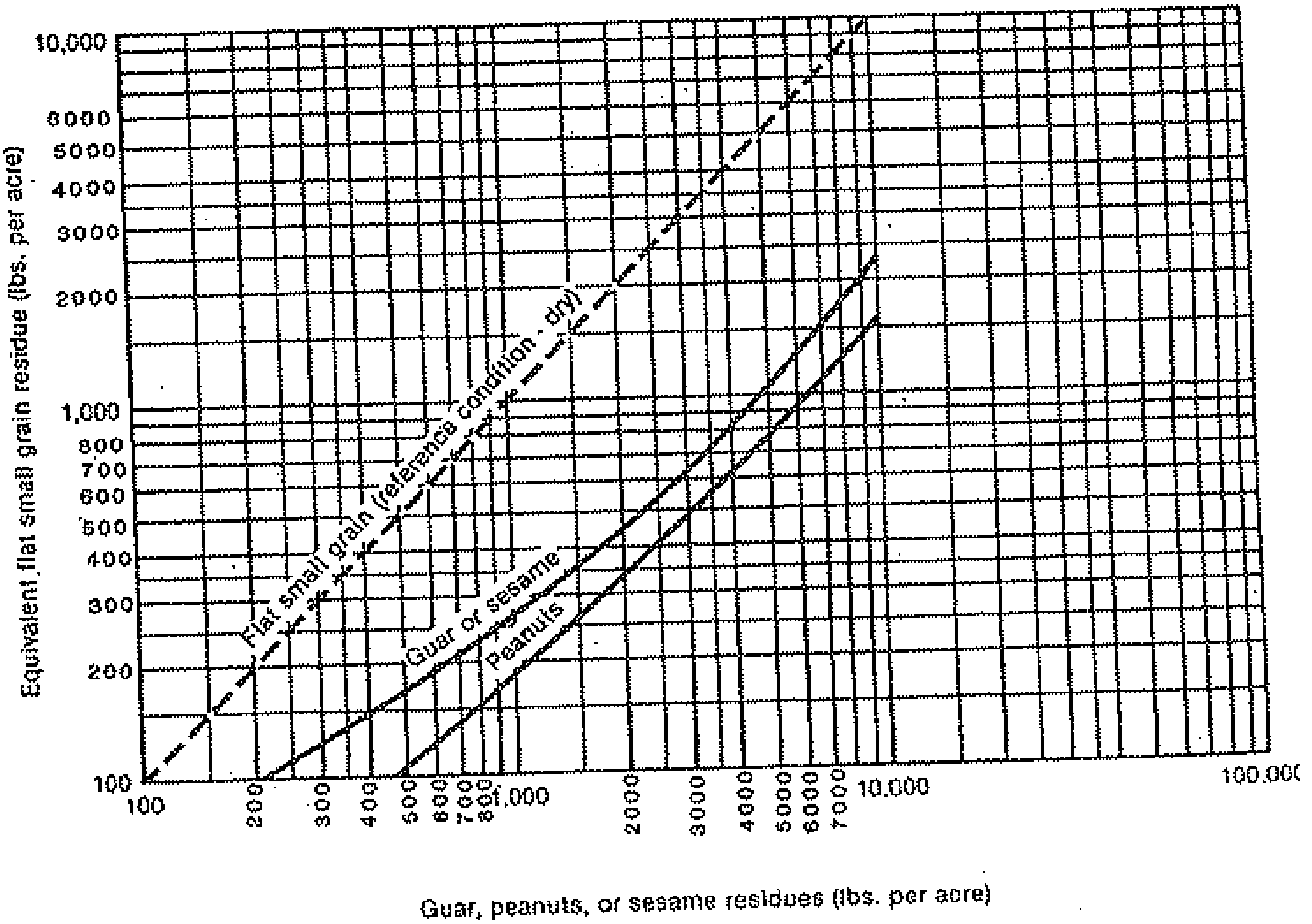


CHART 2 — Alignment chart to determine: (1) Distance across field strip along the prevailing wind erosion direction from width of field strip and prevailing wind erosion direction, (2) width of field strip from prevailing wind erosion direction and distance across field strip along prevailing wind erosion direction.
From: "Guide to Control Wind Erosion"

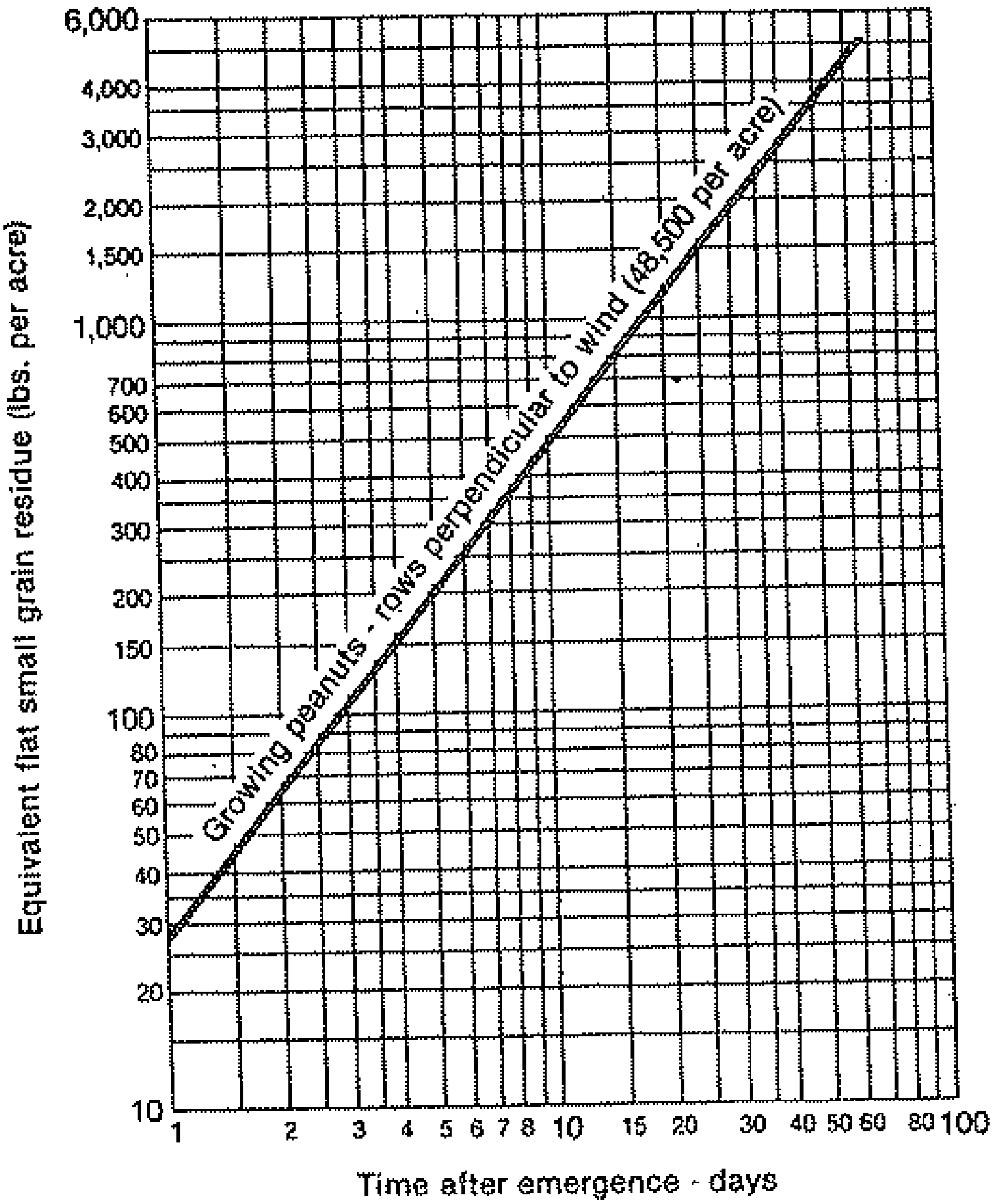
CHART 3

Flat Small Grain Equivalents of Peanuts, Guar, and Sesame Residues



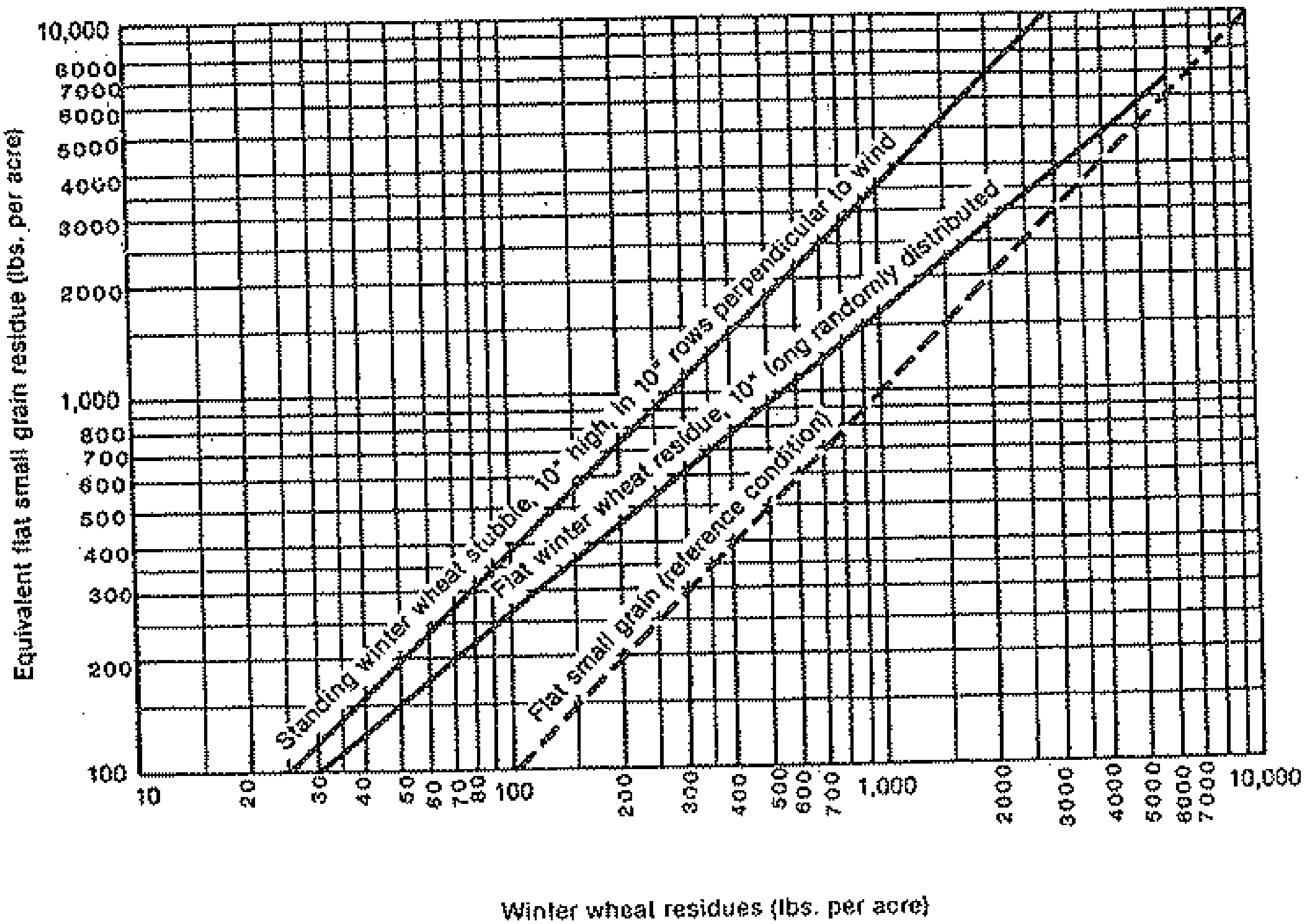
Source: Best Judgement Estimates by SCS.

Flat Small Grain Equivalents of Growing Peanuts: Days After Emergence



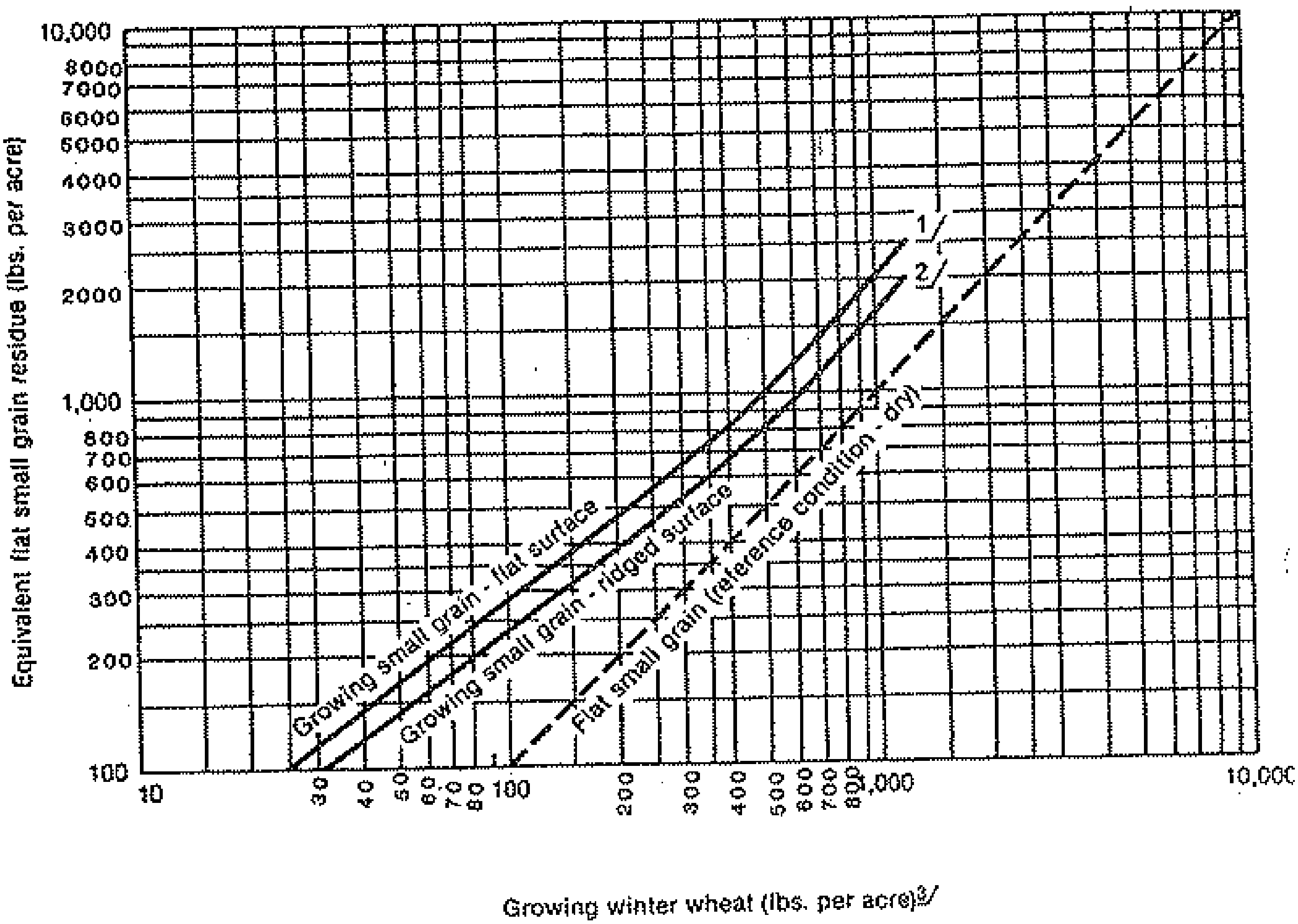
Source: Armbrust & Lyles, 1984-unpublished.

Flat Small Grain Equivalents of Winter Wheat Residues



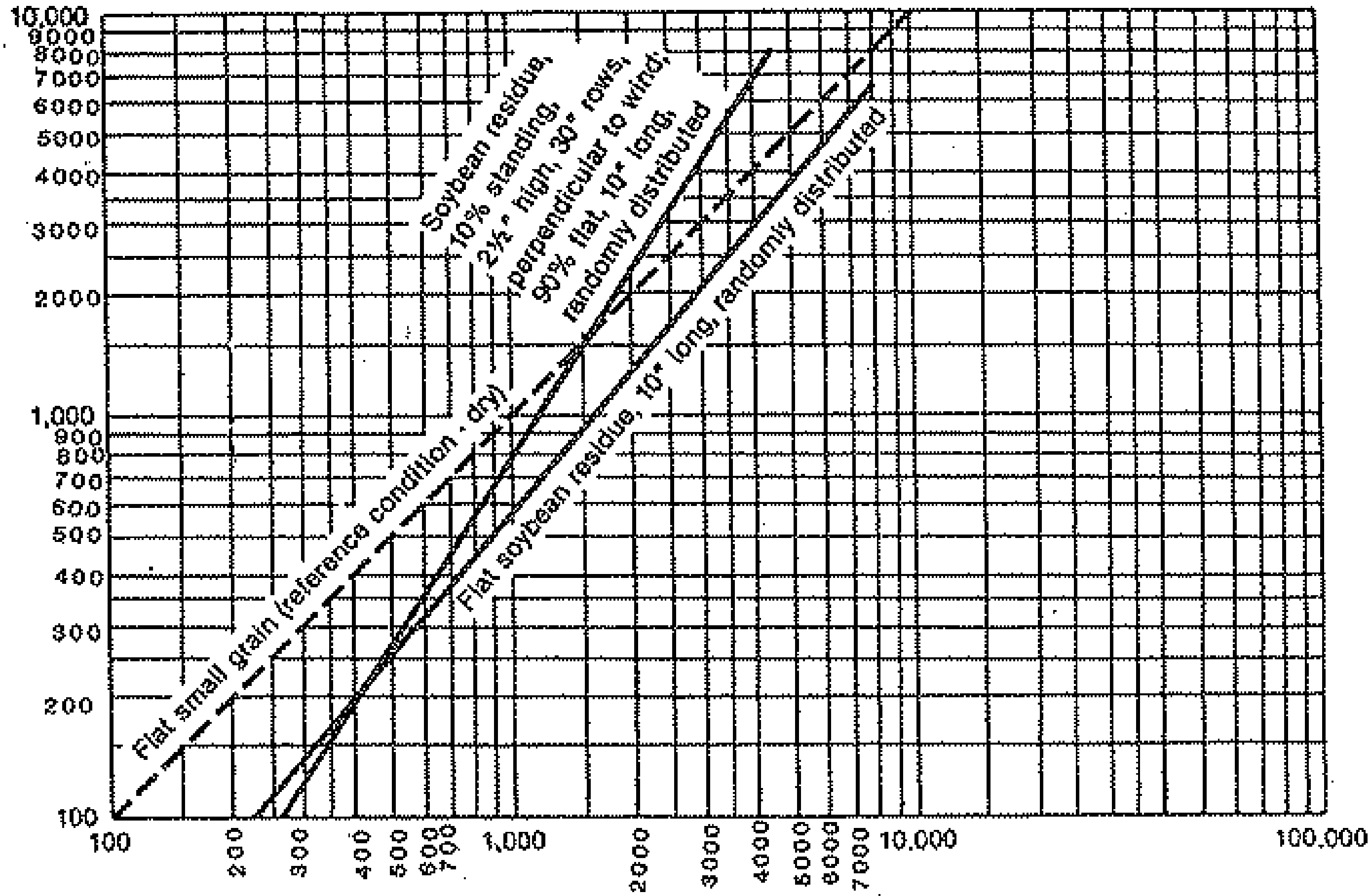
Reference condition—dry small grain stalks 10" long, lying flat on the soil surface in 10" rows perpendicular to wind direction, stalks oriented to wind direction.
Source: Lyles and Allison—Trans. ASAE 1981, 24 (2): 405-408.
Residues are washed, air dried, and placed as described for wind tunnel tests.

Flat Small Grain Equivalents of Growing Winter Wheat



Sources
1/ Siddoway, F.H., W.S. Chepil, and D.V. Armbrust 1965
2/ Estimates by Best Judgment of SCS Personnel.
3/ Air-dry weights of growing winter wheat from emergence to winter dormancy.

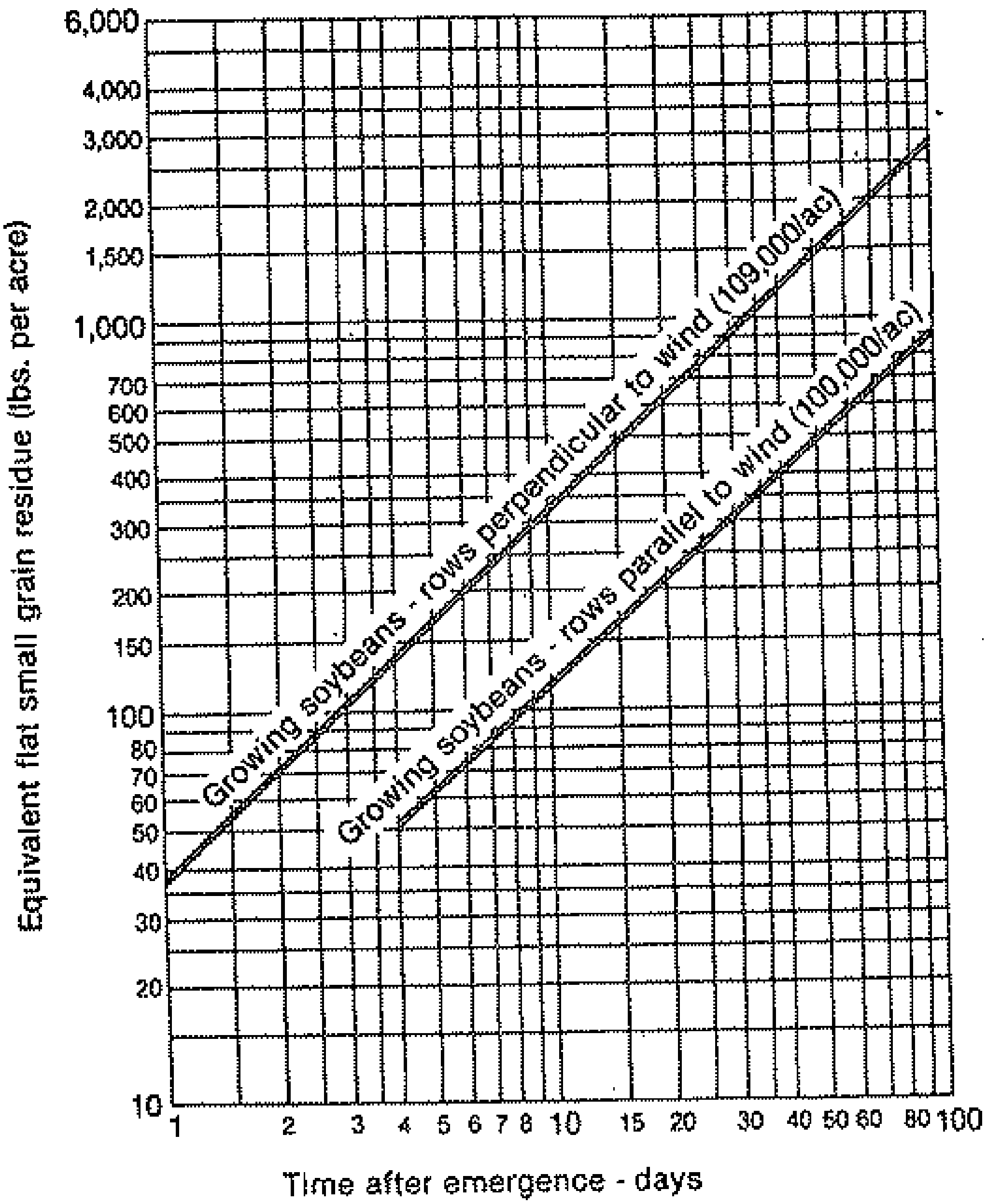
Flat Small Grain Equivalents of Soybean Residues



Source: Lyles and Allison, Trans. ASAE 1981, 24(2): 405-408.
Residues are washed, air-dried, and placed as desired for wind tunnel tests.

CHART 6-A

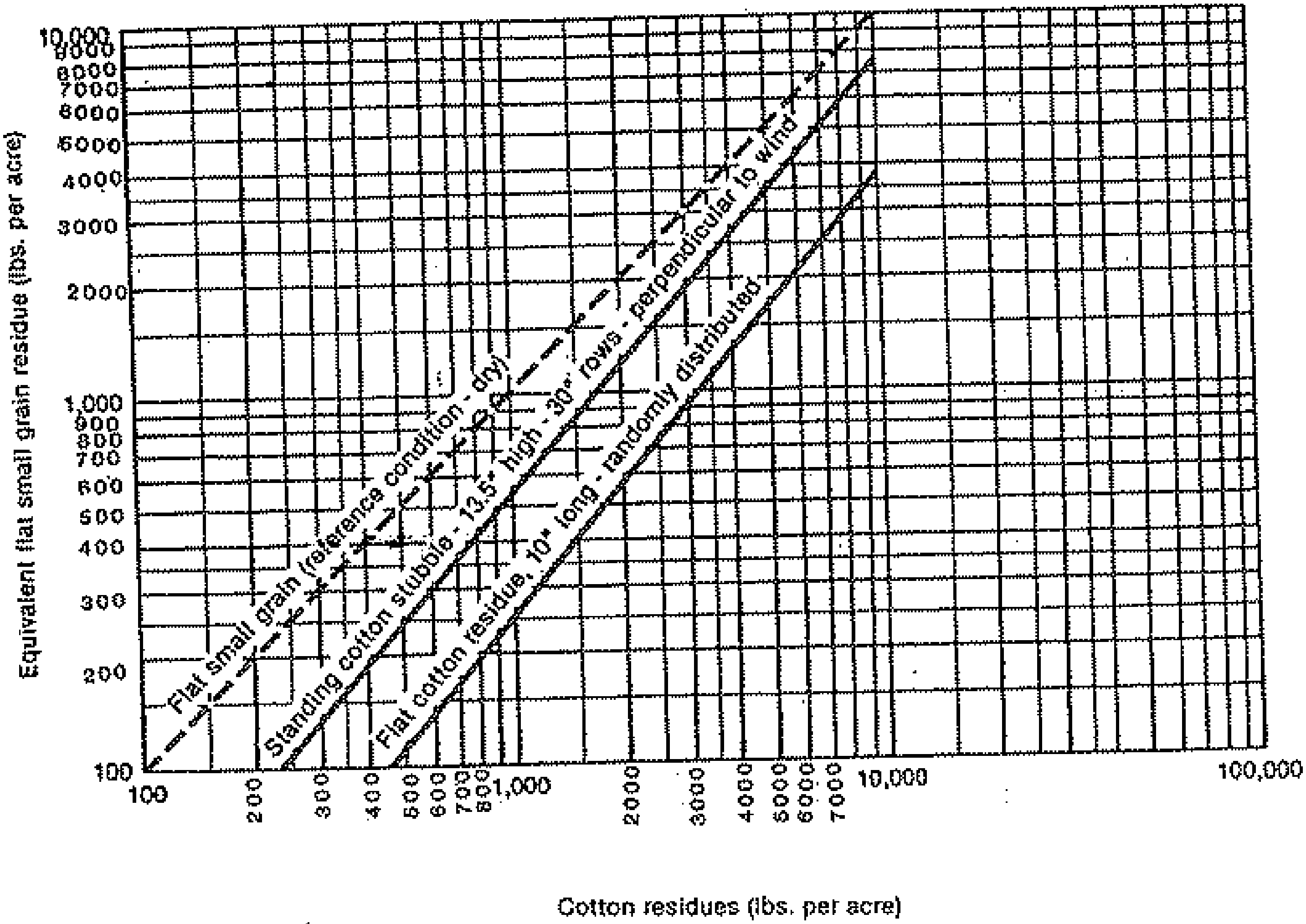
Flat Small Grain Equivalents of Growing Soybeans - Days After Emergence



Source: Armbrust & Lyles, 1984-unpublished.

CHART 7

Flat Small Grain Equivalents of Cotton Residues



Source: Lyles and Allison, Trans. ASAE, 1981, 24(2): 405-408.
Residue wts. are washed & dried, placed as described for wind tunnel test.