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Title: PEAT SOIL CONSERVATION AND PEAT DUST ABATEMENT

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The method developed last year was continued in the 1958 wind season. All together 16 wind profiles were measured alternately over bare and interplanted asparagus rows. The asparagus fields had tall grown barley interplantings near Terminous, and on Rindge Island the fields were interplanted with low barley (late seeding). These low barley strips had a rather large width of 9 to 12 inches and proved to be successful also, but to a smaller degree.

The measurements were analyzed according to the power law for wind increase with height, and the criterium found very revelant last year was used again. It consists of the determination of the "virtual" or "effective" height of the surface, the height at which each individual ~~measured~~ fitted profile would reach the velocity zero. This height would be identical with the surface if the latter were a polished plate. In case of a rough surface the velocity decreases at a different rate toward the surface, converging to zero at a new height, which was determined graphically preferring for it the term "equivalent surface height" (d). In the following tabulation the results for d are given with respect to the ridge tops, in cm:

	1957 tests	1958 tests
Bare ridges, wind parallel	-10 cm	0 cm
Bare ridges, wind across	-11 to -15 cm	-2 cm
Tall interpl., wind parallel	+5 cm	0 cm
Tall interpl., wind across	+13 to +47 cm	+30 to +40 cm
Low interpl., wind parallel	-6 cm	--
Low interpl., wind across	--	+10 to +18 cm

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It can be seen that the 1958 values corroborate the previous ones: Without interplantings, the equivalent surface is below the ridges, but interplantings lifted it considerably above them. The 1958 values for conditions of wind directions parallel to the ridges are not as realistic as they were in 1957, but it should be remembered that our method is based on an empirical equation which might not be satisfied in some individual cases. Especially for these parallel wind conditions, more measurements will be needed for establishing reasonable averages.

On the other hand, many investigators not finding the power law satisfactory either in all cases, began to study to which degree of accuracy the atmospheric wind conditions could be expressed by the logarithmic law of wind increase with height found by Prandtl in wind tunnel experiments:

$u = \frac{\sqrt{\tau/s}}{k} \ln\left(\frac{z-d}{z_0}\right)$, where u is velocity and z the height.

This formula has more opportunities because it permits the determination of the roughness-coefficient z_0, and also the friction velocity u_* which is related to the shearing stress τ by the expression $u_* = \sqrt{\tau/s}$. The equation can therefore be rewritten, and using the value 0.4 for Karman's constant k, we obtain $u = \frac{u_*}{0.4} \ln\left(\frac{z-d}{z_0}\right)$ One of the biggest drawbacks of this Karman's formula is that it can only be used in neutral stability condition which seldom occurs. Various investigators therefore suggested a number of adjustments for stable and unstable temperature stratifications with more or less success. These adjustments can hardly be applied in cases of high surface roughness, because d must be known first. The British and Australian teams therefore investigated air flows only over such fields where the zero-displacement height d could be determined with a yardstick. Because this cannot be done in asparagus fields, the logarithmic

law was not used, and we have only worked with the power law so far. However, in 1958, one pair of profiles could be obtained under cloudy skies and rather neutral conditions might be assumed. The profiles plotted on semilog paper should then be straight lines in case the heights for the effective, called "equivalent surface" (d) are chosen correctly. In figure 3 this was accomplished with d = +20 cm for profile L_8 and d = -10 cm for profile J_8. The calculation of the various coefficients in the logarithmic formula resulted as follows:

	d	z_o	u_*(at 25 cm)	C_D(at 25 cm)
Bare ridges (J_8)	-10 cm	.02 cm	123 cm/sec	.16
Interplantings (L_8)	+20 cm	.94 cm	322 cm/sec	3.08

The equivalent heights of +20 vs. -10 cm, which we still think, are most revealing because they are descriptive are in the expected range. The roughness coefficients z_o show a very revelant difference, both values should be expected somewhat higher, but they are falling into the right order of magnitude. The friction velocities u_* also were tabulated because they permit the calculation of the drag coefficient defined by $C_D = 2(\frac{u_*}{u})^2$. The C_D values between bare ridges and interplantings compared at a ratio of 1:20. During the following seasons, more profiles under neutral conditions will be sought at either cloudy weather, which occurs seldom, or perhaps at sunset hours.

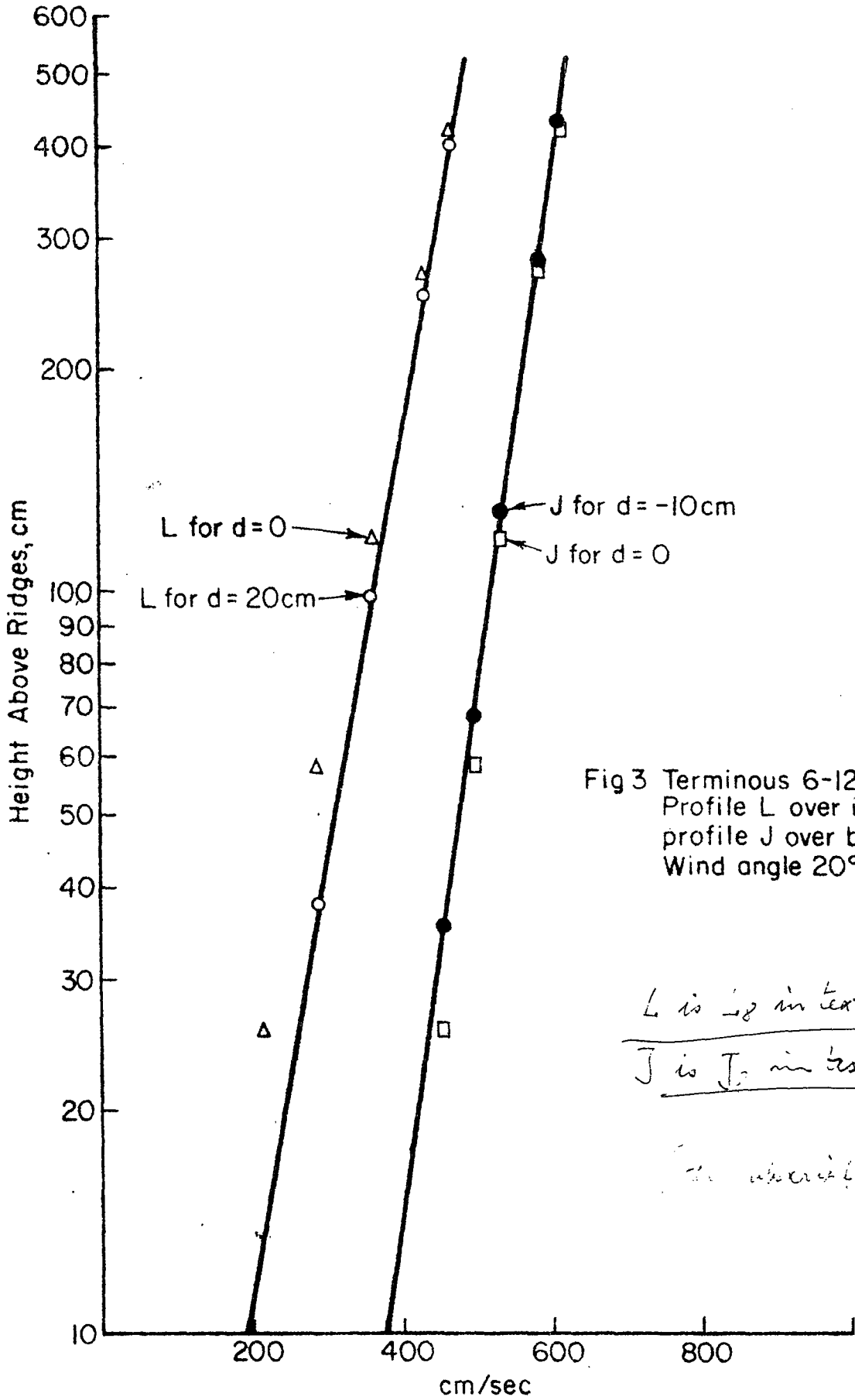

Fig 3 Terminous 6-12-58.
Profile L over interplantin
profile J over bare ridges.
Wind angle 20° with ridges

L is L_8 in text

J is J_8 in text

[illegible] subscript 8 means ye