December 26, 1992

RESEARCH REPORT: PINELANDIA BIOPHYSICAL LAB.

LABORATORY Code: KS-01-80

PLANT MATERIAL: Wheat plants and heads, *Triticum aestivum*

FORMATION: Silbury Hill ("Happy Eater"), England

SAMPLES COLLECTED BY: Names on samples: Monty Keen & George Wingfield

COMMENTS ON SAMPLES: Three control sets were submitted and were given a code designation for simplification purposes - the portion in quotes was taken directly from the information on the sample labels.

C-L1 - "control-lodged Aug. 19-20"
C-L2 - "control-lodged"
C-V - "control-vertical"

LABORATORY EXAMINATION: In previous reports the pit size data etc. have been listed in a table form. In the data here the bar chart presentation is employed so that the measured variables can be more readily compared with one another. In Fig.1-B the pit diameter data are shown for each of the three controls and the four circle samples (bottom chart) - those showing statistical significance, relative to the (C-V) vertical controls are indicated above the bars.

In the upper chart the development factor, Df is statistically compared with the vertical controls, although all three control groups are shown. Within the control groups there is no significant difference between the lodged and upright samples, either in pit size or the Df factor. The similarities in the upper and lower bar charts indicate there is a relationship between the Df level and the pit size. This correlation is shown in Fig.2, where the small rectangle in the central region designates the controls. Again, as was pointed out in Report#9, the Df and pit size ranges lie outside the control range.

COMMENTS:

One very obvious difference between the Report#9 samples and those discussed here is the very clear cut negative correlation between pit size and the Df factor in the KS-01-39 formation and the clearly positive correlation (Fig.2) within the above samples. One might readily argue the point that in these two formation studies, the Pit-Df correlation is in both cases simply reflecting a chance grouping which has no particular relevance to the circle formations. This notion would be far easier to accept if the correlation coefficients were not at the high levels seen here (r= 0.8-0.9), and in addition the consistent difference between the data ranges within the controls and formation samples.

From a slightly different viewpoint - if this most puzzling situation is examined from the perspective of a system operating under conditions of deterministic chaos then a crack of light begins to shine under the door of understanding. In the final section of Report#13 is a brief discussion of this type of broadly utilized mathematical concept as it may be applied toward examining the unpredictability within the energetics and the geometry of crop circle formations.

If, as our previous studies have indicated, here are several types of energies involved within the complex vortex structures, then under chaotic conditions they would be expected to operate quite independently of one another. Slight instabilities in these energy vectors could disrupt the dynamically operating chaotic systems to the point of being expressed in the plant cell development as a positive correlation between two variables in one case and a negative in another or none at all. It is quite apparent that this hypothesis needs to be developed from a much larger data base than is now available. Complex situations such as we have seen develop in the last few formation studies will require considerable in depth investigation before we are able to discard or accept this working hypothesis based on deterministic chaos principals.

Dr. W.C. Levengood

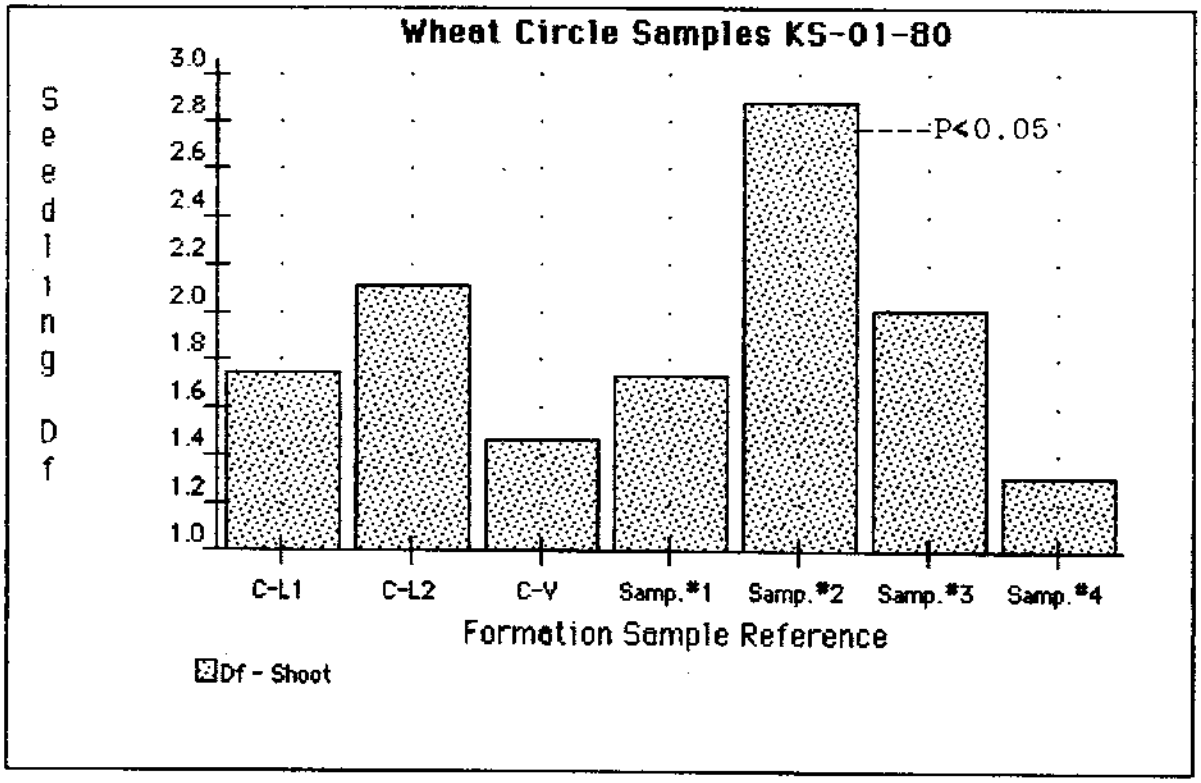

Fig.1-A Bar chart showing distribution of Seedling Development factor (stat. analysis based on C-V control)

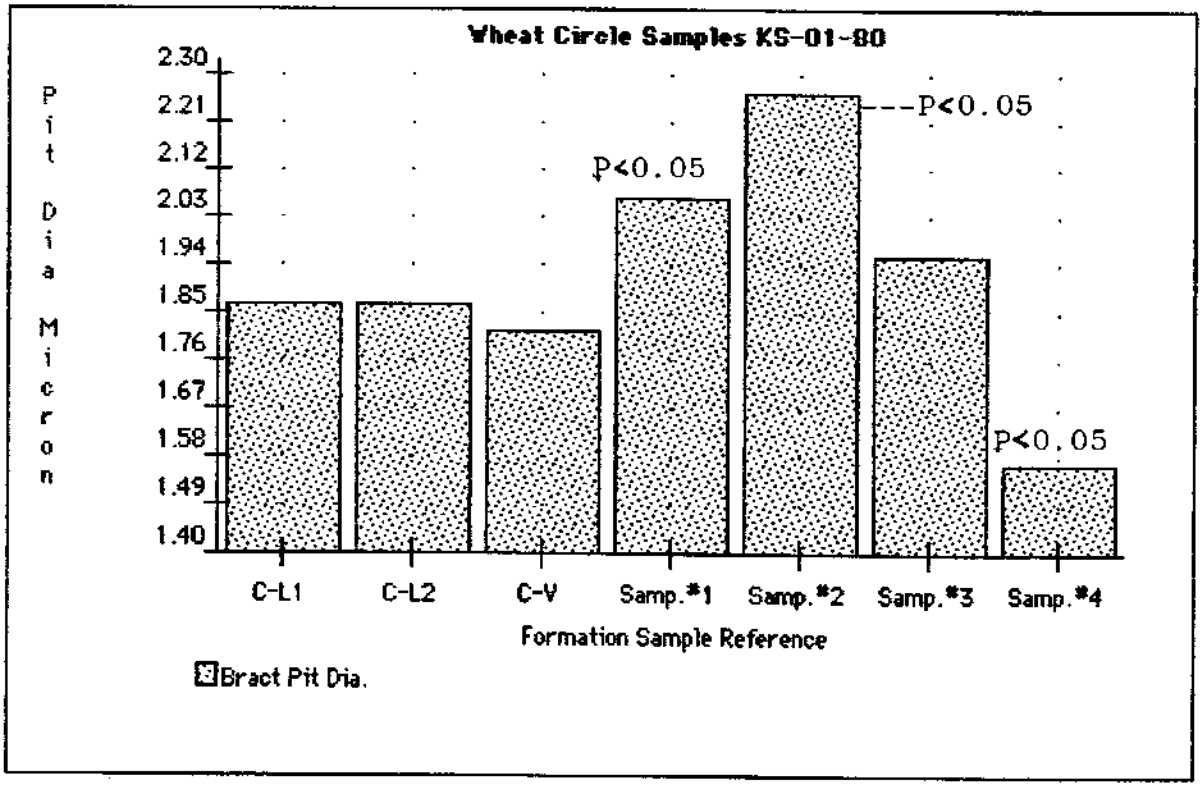

Fig.1-B Chart showing distribution of cell wall pit sizes in crop circle samples (stat. analysis based on C-V control)

Fig.2 Linear regression analysis from crop circle samples (r=0.84). Shaded rectangle shows range of three control samples.