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LAB REPORT #19

INTRODUCTION

Laboratory Report #19 treats the first known complex crop formation in New York State. It occurred in oats which is important because experience from other formations in oats shows this plant to be extremely variable in its levels of the factors studied here. The New York formation amply deomstrates this variability. Nevertheless the samples show significant differences from the controls, indicating physical changes due to energies of a non-linear, chaotic nature.

Table 1 lists the data in five columns. Each column represents the mean of six separate measurements. See Page 1, Fig.1 for locations:

Column 2 - Node Bending: Lists the number of degrees of bending on the fifth node (N5) on the stalk, the only node with significant bending. All samples show greater bending than the two controls (Cont-5, Cont-6). No patterns are clear except to say that a different distribution of energies occurred in Circles #1, #2, and #4 than in other locations.

Column 3 - Node swelling was so extreme on stalks within the formation that on the 4th and 5th nodes the plant wall actually split. Column 3 shows the frequency of splitting in each sample, though not the severity. Note no splitting occurred in any of the controls. In the formation samples however, in some cases holes were actually blown right through the tissue creating what we have termed "expulsion cavities". Some of the internal cytoplasm has been blown right through these holes onto the outer surface of the plant. Later reports will discuss even more severe forms of expulsion cavities found in English samples this year. Though mechanical crushing can form some similar damage, there are specific features that set these cavities apart. This will also be discussed in future reports. All damage seen is consistent with rapid, internal heating, such as might be caused by microwaves.

Column 4 - Seed Germination and Development Factor (Df): This number is a combination of speed of germination of the seeds and the rate of growth after germination. No pattern is seen for this formation when samples are compared to controls. If a mean value of 13 is taken for the controls, then most of the formation samples had their growth suppressed. Yet a later visit to the formation showed that seeds still on the stalks within the formation were already germinating right on the stalk while those in the standing crop were not. These samples will be examined at a later date.

November 2, 1993

RESEARCH REPORT: PISELANDIA BIOPHYSICAL LAB.

LABORATORY Code: KS-01-164

PLANT MATERIAL: Plants and heads, *Avena sativa*

FORMATION: Columbia center, New York, First seen July 22, 1993.

SAMPLES COLLECTED BY: Mr. Ron Taylor and Mr. Jim Cormia (N.Y.) on Aug.7, 1993

COMMENTS ON SAMPLES: Excellent scale diagrams were submitted by Taylor and Cormia, on which the locations were noted for 17 formation samples and two controls. Plants received at the lab. were well dried down and in excellent condition for study. In addition several detailed maps and photographs were very helpful in this study.

LABORATORY EXAMINATION:

As the plant samples are discussed, reference will be made to the specific locations at which the samples were collected. For this reason the reader may want to refer to the diagram designated here as Fig.1; on which the approximate locations for the "pathway" samples have been added. The arrows indicate the swirl directions of the downed plants in the circle formations.

Three samples were collected from each of the four, numbered circular formations, one from the center, which for example, in the case of circle #1 is designated as Samp. #1-A, one midway to the periphery, designated Samp. #1-B and one at the perimeter of the circle #1-C. The pathway samples were designated as "A-1", "B-1" etc.

I.) STEM NODE BENDING AND LATERAL SPLITTING:

The second column in Table 1. provides a summary of the node bending taken at the N5 position (although data were recorded, no significant node bends were noted at the N2-N4 locations). These values are the mean bending (in degrees) from the vertical position of the stem and represent about six to ten plants per sample.

Although the formation plants all displayed greater degrees of bending than the two controls there are no obvious patterns within the specific formations. The slightly higher levels of node bending in circle formations #1,#2 and #4, suggest a different distribution of energy inputs than occurred in the other locations. This is further indicated by the nature and severity of the lateral node splitting. The data in column three show that the frequency of the splitting in the lateral fibers within the nodes, is about the same in all the formation samples. These data do not however, reflect the specific form and severity of the disruptions in the node fibers.

At the N4 and N5 nodes in a number of the circle formation plants, were alterations which, after extensive study have been given the term "expulsion cavities". Examples of this aberration are shown in Fig.2 (a) and (b) from nodes in samples #1-A and #1-B, both located at the N5 position on the plant. The term expulsion cavity is used for the reason that there appears to be an almost explosive release of the exudate or cytoplasmic material within the cells of the nodes.

During the 1993 research program, other, more sever forms of these expulsion cavities have been recorded and these results will be discussed at a later date. If the energies producing the crop formations are concentrated at the nodes along the plant stem (this certainly would be the case if microwaves are involved) the rapid heating and intracellular pressure buildup would expand the cells and if the elastic limit of the cell fibers is exceeded, rupture occurs. Although one might produce this type of crushing by mechanical means, there are distinguishing features in the crop formation nodes which set them apart from simple, mechanically produced effects. This aspect of the research will be discussed in later reports.

II.) SEED GERMINATION AND SEEDLING DEVELOPMENT FACTOR Df

Paper roll germination tests were conducted in the usual manner and periodic measurements taken out to the 12 day development stage. The 12-day seedling development data in column four in Table.1 are quite variable and again no specific patterns can be defined. The Df value for Control-5 is less than one half the value in Control-6, a difference which seems rather high even after taking into account the variable nature of oat germination. Perhaps it should be pointed out that Control-5 was taken less than one diameter outside circle #4 whereas control six was at about two diameters. In the past we have seen indications of a "spill over" effect in the energies, but we cannot be sure of that in this case.

If we take a mean Df of 13.0 for the two control samples we find that only four of the seventeen formation samples have Df values above this level. This strongly indicates that the formation energies suppressed the germination potential in the seeds. This is in contrast to later, site observations made by Mr. Taylor on Sept. 23, 1993, where it was noted that seeds on the plants in the formation had germinated, in contrast with no germination in the controls. Precocious germination often occurs in grain left for late harvest, and it is a real problem to differentiate between the effects of slight variations within the micro-environment and other influences such as crop formation energies; however, samples of this precocious germination have been submitted by Mr. Taylor and they will be examined at a later date. It will be interesting to note if the same type of growth differences are noted here as was observed in other formation material (Report No.16).

III.) OSC AMPLITUDE COEFFICIENTS (ALPHA LEVELS)

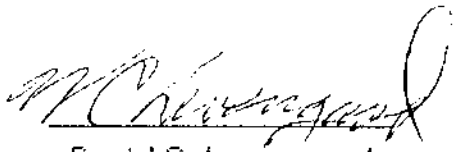
The data in columns 5 and 6 in Table.1 show the relative change and the degree of statistical significance obtained from the alpha value analyses (see Report No.18). In the t-test analyses any value over 2.0 is significant and a value of 3.0 or higher is highly significant ($P<0.005$). The circle formation samples #1-B and #2-B gave outstandingly high alpha values and they alone provide clear evidence of transient energy effects which are phenomenologically consistent with the application of externally organized forces within the formations.

This is the first series of samples in which significant, negative alpha values were generated. This means that the amplitude coefficients in the formation samples are significantly lower than the controls. One is reminded here of the reduction in the cell wall pit sizes in samples given prolonged heating in a microwave environment. Could it be that the plants in those samples showing large negative alphas, have been heated and exposed in a different manner than those with positive alphas?

One clue that different heating occurred in those samples from the negative alpha series was obtained from detailed examination of the nodes. In sample #3-B a newly observed "blistering" effect occurred, and this seemed to contrast with splits and expulsion holes formed in samples with positive alphas. In Fig.2 (c) several blisters form around the node and appear to be more superficial than the expulsion cavities. The blister effect does not extend completely around the stem as shown in the "Side-2" view. A more prolonged, but less severe heating would disrupt the outer cell layers on the node without causing internal bursting. The node in Fig.2

(c) also seems to be foreshortened when compared with the controls and this also may indicate a thorough heating to the point of producing a softening and vertical collapse of the node cell fibers. Again we find evidence for regional differences in the rates and levels of energy delivery throughout this formation.

For those who have a keen eye, a comment should be made concerning the alpha levels in samples #D-1 and #E-1 (both strongly positive). In the #D-1 sample the variance of the alphas was over 12 times the value in the control set and as might be expected the +66.7% increase was not statistically significant, whereas the much lower variance in #E-1 gave a high significance to the +61.4% alpha change. Sample #D-1 was the only formation set showing an extremely high level of variance. This also serves to demonstrate the importance of having sufficient data on which the statistical t-test analysis can be conducted.



Dr. W.C. Levengood
Pinelandia Biophysical Lab.

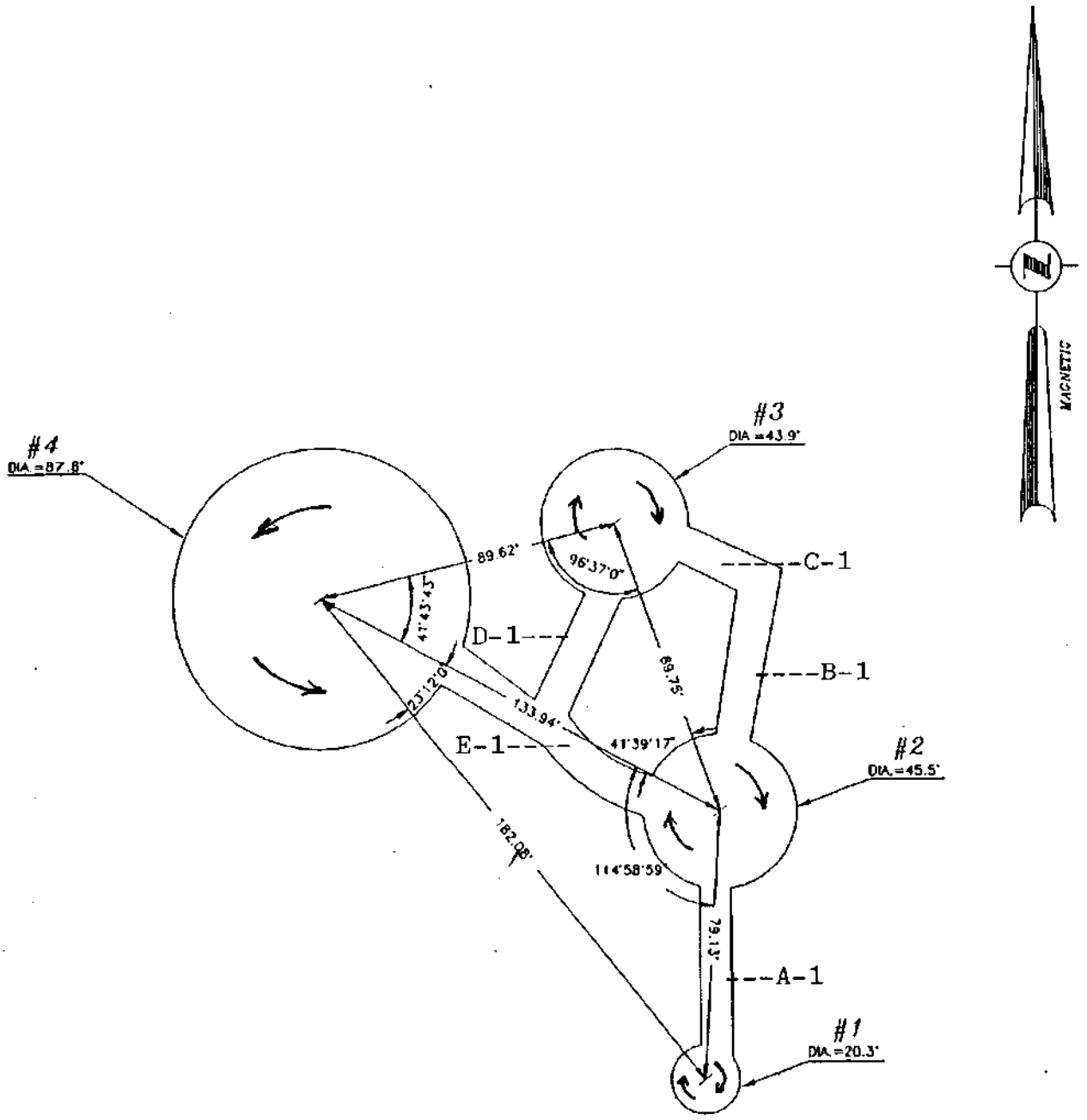
Table 1.

Tabulated data from the N.Y. crop formation (KS-01-164)

Column-1 Sample designation, see Fig.1 for location.
Column-2 Degree of node bending (ave. 6-10 plants per sample)
Column-3 Node splitting - fraction of total examined in N4 and N5.
Column-4 Seedling development factor at 12-days (Df= Fg x L)
Column-5 Percent change in mean alpha value relative to control set
Column-6 Statistical t-test for paired data sets (N.S.=not sig.)

Samp.	Bending	Splitting	Df	Alpha Change %	t-test
#1-A	17.7	0.25	2.46	+18.2	0.75 (N.S.)
#1-B	29.5	0.25	6.62	+123.9	4.66
#1-C	12.4	0.36	12.16	+47.9	3.57
#2-A	8.0	0.5	8.83	+4.0	0.21 (N.S.)
#2-B	12.0	0.3	8.93	+214.6	5.46
#2-C	18.0	0.5	13.43	+97.1	3.52
#3-A	10.7	0.11	11.60	+47.8	2.35
#3-B	7.9	0.43	15.71	-39.1	2.42
#3-C	10.0	0.57	15.80	-15.3	0.66 (N.S.)
#4-A	21.0	0.35	10.38	-51.6	3.34
#4-B	11.2	0.33	10.85	+35.4	1.68 (N.S.)
#4-C	13.0	0.67	17.73	+74.6	5.68
#A-1	8.4	0.5	6.10	-47.2	3.68
#B-1	16.9	0.29	7.38	-78.6	4.54
#C-1	10.7	0.07	10.10	-5.0	0.34 (N.S.)
#D-1	13.3	0.33	3.62	+66.7	1.56 (N.S.)
#E-1	9.1	0.36	3.96	+81.4	3.45
Cont-5	2.7	0	8.35	-----	------
Cont-6	2.45	0	17.64	-----	------

Fig.1



BAR SCALE

50 0 25 50 100

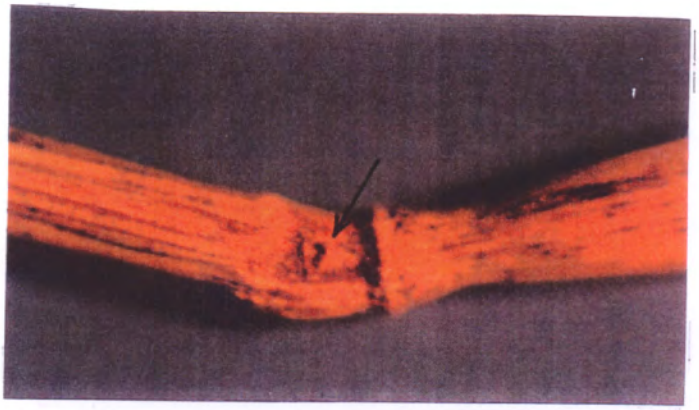
1 inch = 50 ft.

MAP
OF
CROP CIRCLES
COLUMBIA CENTER, NEW YORK
PREPARED FOR
CENTRAL NEW YORK QUESTERS
BY
C.T. MALE ASSOCIATES P.C.

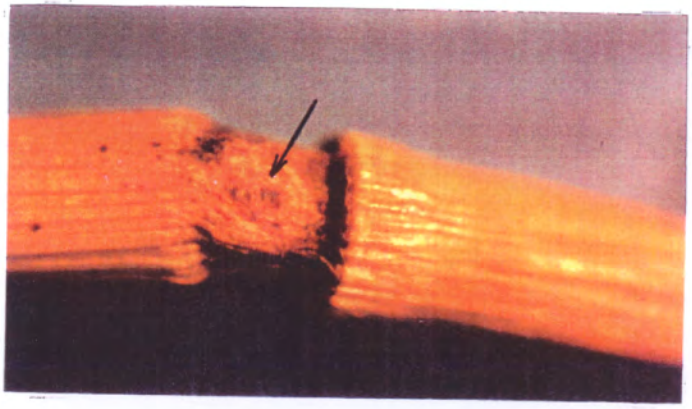
Field measurements taken Fri. August 6, 1993.
Formation first seen Mon., July 26, 1993.

Fig.2 Stem node alterations indicative of internal heating effects in the NY crop formation (KS-01-164)

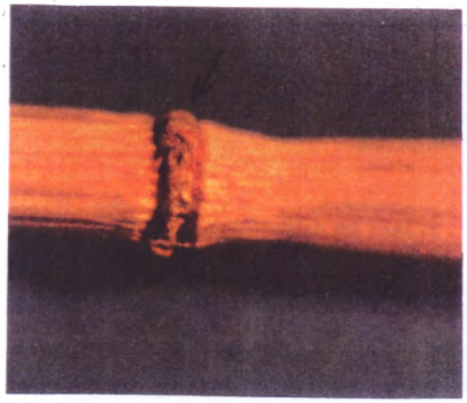
(a) "Expulsion Cavity" in a stem node (Samp.#1-A, plant-6, N5-node)



(b) Less localized expulsion cavities (Samp.#1-B, plant-5, N5-node)



(c) "Blister" -- effect on node. (Samp.#3-B), Plant-6, N4



Side-1

Side-2 opposite