Delineation of Electromagnetic Energy Influencing Crop Formations

Introduction:

We have recently discovered that the transient, high heat input energy producing stem node swelling, splitting and expulsion cavities in crop formations, is of electromagnetic origin. Although this has been a putative concept for some time, the data presented here demonstrate that the energy mechanism producing quantitative alterations in the plant stem nodes, falls within the framework of a straightforward and widely applied principal of physics dealing with the absorption of electromagnetic energy by matter. Furthermore, the nature of these results strongly suggest that the energy originates in the microwave region of the electromagnetic spectrum, a region which covers a wide range of frequencies.

In order to examine this fundamental pattern of energy absorption it was necessary to have precise location measurements for samples collected within and outside the crop formations under study. This report discusses two formations which fit these criteria (others are currently being examined).

1) a 1993 formation at Devises, UK, (designated KS-02-57) - sampled by Chad Deetken and Nancy Talbott.

2) a 1994 formation at Chehalis, Washington, USA (designated KS-02-66) - sampled by ilyes.

An external segment or satellite of the Devises formation, consisting of an equilateral triangle (KS-01-172) was discussed in Report No.21, issued March 26, 1994. In this satellite study it was shown that severe stem node bending was accompanied by a significant reduction in seed head size, seed weight and seedling development. An important point to keep in mind while reading the remainder of this report, is the fact that the severe depression of seedling growth was observed in normal appearing, standing plants taken 5 ft. outside the triangle formation, but not seen in the controls taken 50 ft. outside (see Report No. 21). This obviously severe energy impact prompted the further studies of the Devises formations.

Theory of Energy Absorption:

The stem node heating and rapid expansion from the energy striking the plant is examined in relation to the fundamental physics dealing with the absorption of electromagnetic radiation by the plant tissue. The principal applied here is known as "Beers Law" (Beer is a proper name, not from an idea originating in a pub) and is expressed by,

$$i = i_0(e^{-acd}) \qquad (1)$$

where i is the intensity of radiation striking the plant, i_0 the intensity of the radiation at its source, a is a constant related to the absorption coefficient of the media (in this case air), c the concentration of absorbing molecules (air and water vapor) in the path distance d between the energy source and the plant stem node. Over a given crop formation a and c are taken as constants.

Equation (1) may also be expressed as a fraction of the radiation received by the plant as,

$$i/i_0 = e^{-acd} \qquad (2)$$

We make the assumption that the stem node expansion (denoted here by Nl, the node length) is directly related to the fraction of the energy absorbed into the node tissue, that is,

$$Nl = b\,(i/i_0) \qquad (3)$$

where b is the proportionality constant. From Eq.(2) we now have,

$$Nl = (b)\, e^{-acd} \qquad (4)$$

and taking the ln of both sides of Eq.(4) gives the useful expression,

$$\ln(Nl) = -acd + b' \qquad (5)$$

where b' is the intercept constant. Since a and c are also constant, we would predict a linear correlation between the ln of node expansion and the distance d, between the plants and the radiation source.

Laboratory Results:

The observant reader may have noticed that Nl, the node length is now used in place of the previously examined ratio of stem-node diameters. There are several very important points relating to the way in which Nl or node length has improved our ability to evaluate formations, some are listed below.

1) the longitudinal Nl value gives a reliable, quantitative record of node expansion and does not change as the plant tissue matures and dries down (as does the stem-node ratio).

2) the plant to plant variance in Nl is very low in both the formation stems and the controls, therefore, one can obtain statistically reliable data from sample populations as low as 6-10 plants.

3) with a linear scale graduated in 0.5 mm divisions and a 6X loupe, one can determine Nl with a precision of plus or minus 0.1 mm; whereas the following data give mean differences of one to three mm between the controls and the expanded nodes in the formations.

4) the measurement of Nl (followed by appropriate statistical analyses) provides a rapid, simple method for "field evaluations".

DEVISES SAMPLES KS-02-57:

In this section, data are presented which essentially confirm the model suggested by Eq.(5) and were obtained from node analyses on samples collected in 1993. The summarized data in the following table are the mean values of the node lengths Nl and ln (Nl) for the apical node on plants taken from a 20 ft. circular region in the formation. Paired samples were taken at the same radial distance from the epicenter, but on opposite sides. Each sample contained from 7-12 plants.

Each sample was also examined for node bending and for the presence of splits and expulsion cavities. Although the node bending was significantly higher in the formation plants than in the controls, the variation was high and the data did not fit the Eq.(5) model. This is readily understood when it is considered that the final amount of node bending may be influenced by the degree of mechanical support and re-direction offered by the surrounding plants. Also the presence of a high percentage of splits and expulsion cavities in the formation samples (none were found in controls) can have a pronounced effect on node bending.

Node Length Analysis of Plants From the Devises Circle

Radial Distance from Epicenter ft.	Nl (mm)	s.d.	ln (Nl)
1	5.96	0.83	1.78
1	6.01	0.59	1.79
5	4.42	0.74	1.49
5	5.47	0.61	1.70
9.5	4.41	0.75	1.48
9.5	4.26	0.53	1.45
11	3.33	0.29	1.20
Controls (25+)	3.20	0.46	1.16

In Fig.1 the data are plotted according to Eq.(5) and the correlation is r=0.91, with the points lying within the formation region being significantly higher than the control level, indicated by the dashed line at the bottom of the figure.

Both the seed weight and the resulting seedling growth were drastically reduced in the plants taken within the formation. This however, does not tell the whole story. In 8-day plants, a frequency distribution analysis of plant heights disclosed quite different growth patterns in the formation sample compared with the control areas. In Fig.2 the growth histograms are shown for samples taken at the specific locations. For example, at the upper left are the combined data from both sets taken at 1-ft. from the epicenter, with the growth pattern giving a bimodal distribution, in which a large percentage of the seedlings fall in the low plant ht. ranges (Bar# 1-3). This bimodal effect is not observed in the controls shown at the lower right (normal, single mode), in fact this type of distribution is rarely if ever seen in routine plant growth tests conducted with normal seeds. A trace of the low plant ht. peak is still seen in the data from plants taken at 5 and 9.5 ft., even though a single mode pattern is present.

CHEHALIS, WASHINGTON, 1994 SAMPLE KS-02-66

Here, as in the above formation, the samples were taken at known distances from the center of a circular formation, which in this case had a small region of standing plants at the epicenter. The Nl measurements were taken from the three upper nodes on each plant and the ln of the mean value is plotted in Fig.3 as a function of the position of the plant population in the crop formation.

In Fig.3 we observe a very interesting difference in the node expansion between the upright plants at the epicenter (point at zero distance) compared with the expansion in the three samples of downed plants. This is attributed to the fact that the upright plants would be exposed to high heat energy directed orthogonally, whereas the downed plants would receive the energy at a more oblique angle with lower applied energy per unit area.

The three points from the downed population all lie on the curve predicted by Eq.(5) and give a correlation coefficient of r=0.99, however, it should be pointed out that more samples would be needed for high statistical confidence. These data again strongly suggest a model based on the absorption of electromagnetic energy. When the seeds are taken out of dormancy they will be examined for seedling growth patterns.

Comments:

The material contained in this report is important for several reasons.

1.) The significant, quantitative correlation of node length with the frequently used principal of physics, known as Beer's Law, provides very powerful evidence that node expansion and lengthening is indeed caused by electromagnetic energy (probably microwaves) emanating from a specific origin within the formation.

2) measurements of node lengthening may finally provide the long awaited field test to obtain an indication of a formations genuineness (vs. man made origin). If one plots the apical node length means on a graph (like Fig.1 and Fig.3) and they fall onto a reasonable line, then the nodes have been expanded by an electromagnetic energy source. It seems safe to say that this would represent universally accepted evidence that the formation being measured is not man-made.

3) Anyone using a hand held 6X magnifier and a small ruler graduated in half millimeters, can carry out such measurements on site, in the field. An easy "how-to guide for the required calculations will be issued in a follow-up report before the 1995 season.

Previously much attention has been paid by this laboratory and others, to node swelling as measured by diameters. Measurement of node lengthening is now seen to be more useful, particularly because relative node length, unlike diameter, does not change as the sample dries out.

With widespread use, this technique may help to alleviate the anxiety that has recently permeated crop circle research, regarding whether one should "waste time" studying a formation which might be hoaxed. Some careful measurements and calculations may allow the matter to be definitely settled on the spot. For those of us interested in investigating the phenomenon of crop formations in an objective manner, this is a technique that is likely to become a most welcome tool.

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Fig.1 Linear regression analysis of ln node length (Nl) as a function of location within a crop formation at Devises, UK, 1993 (KS-02-57).
Correlation coefficient r=0.91
Lower dashed line indicates mean level in control groups (see text).

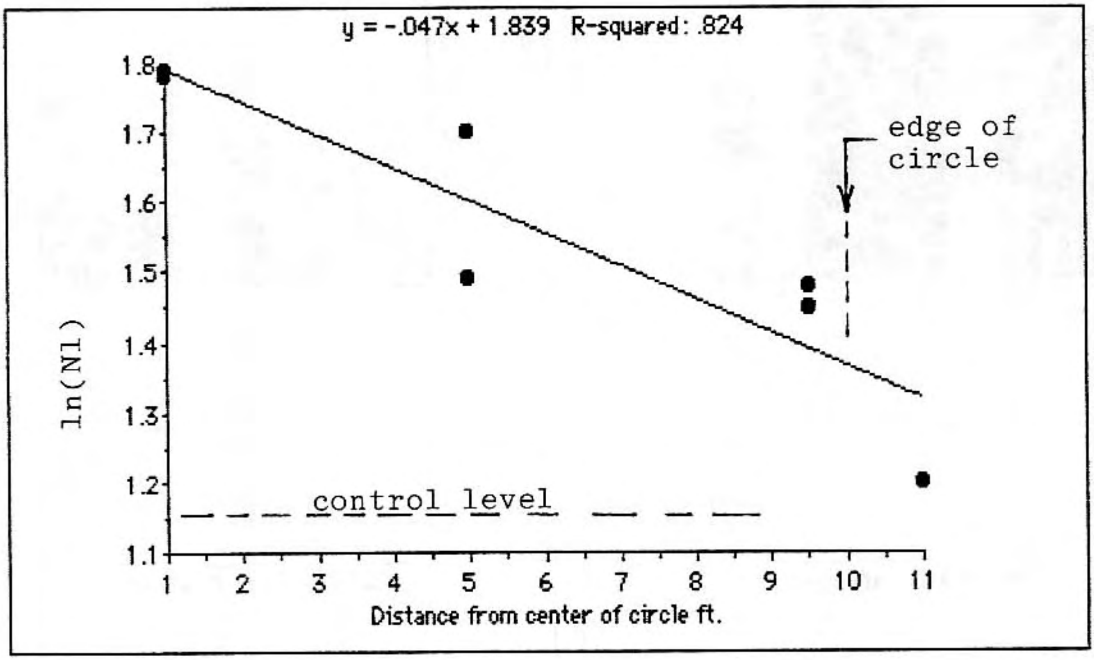
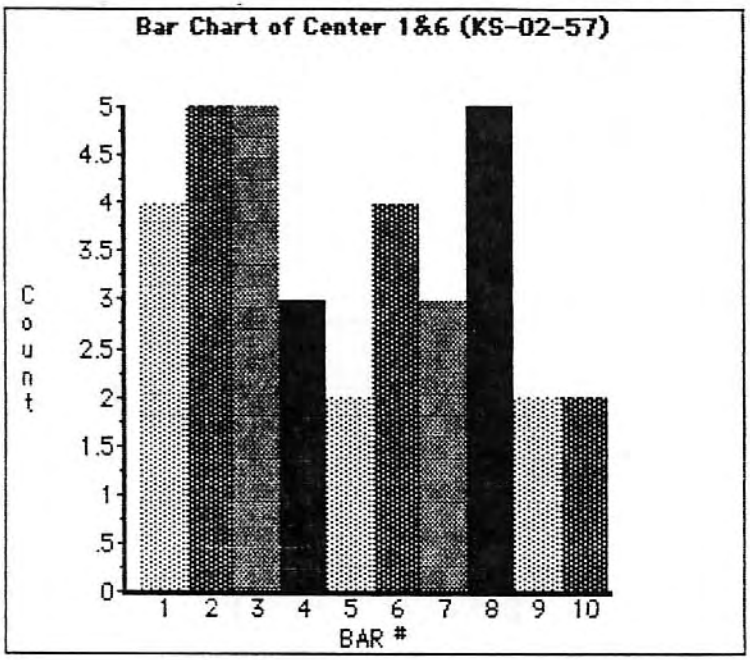
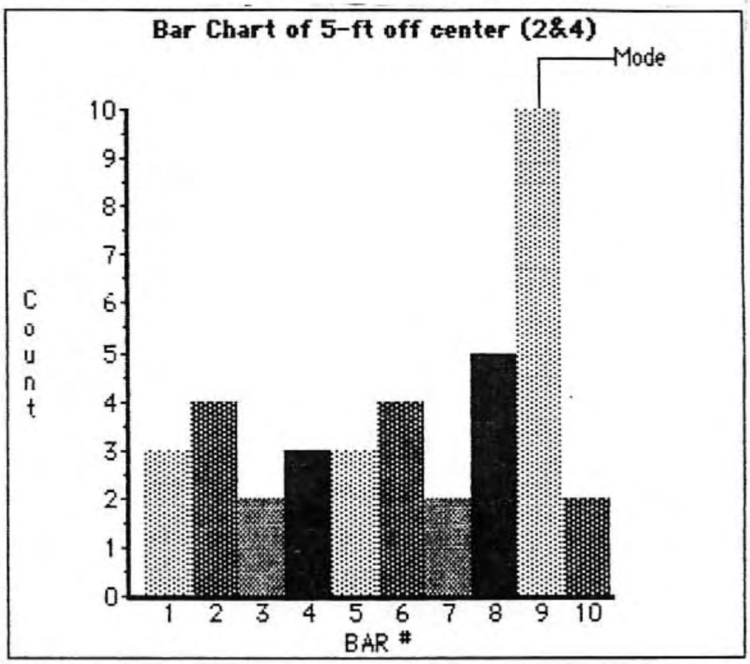
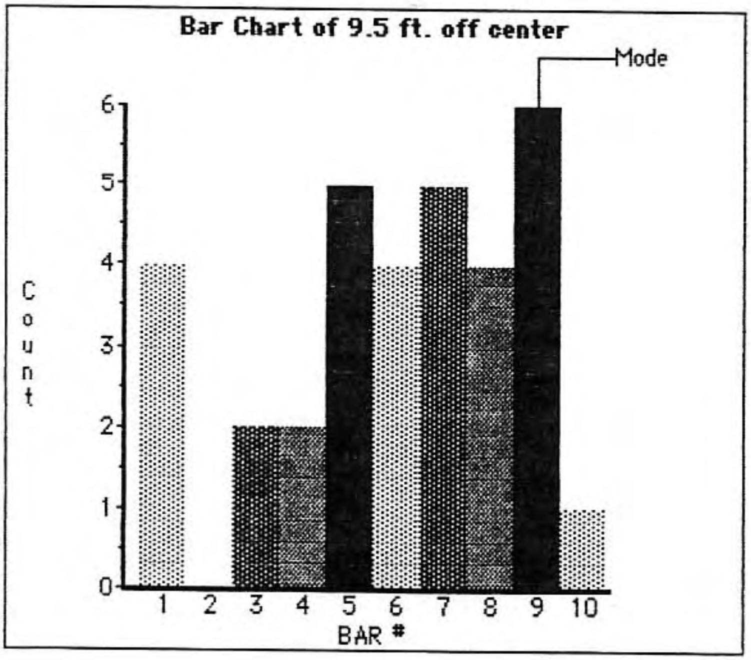


Fig.2 Frequency distribution analyses of sample pairs; 8-day growth from seeds taken from plants at specific locations from the epi-center of a crop formation at Devises, UK, (1993) KS-02-57





Bar# x 2 = Plant ht, range in cm.



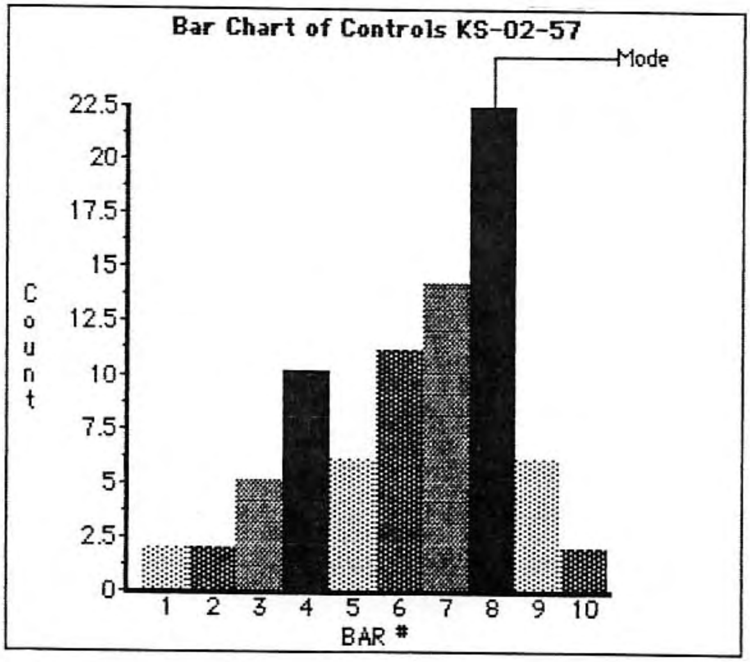
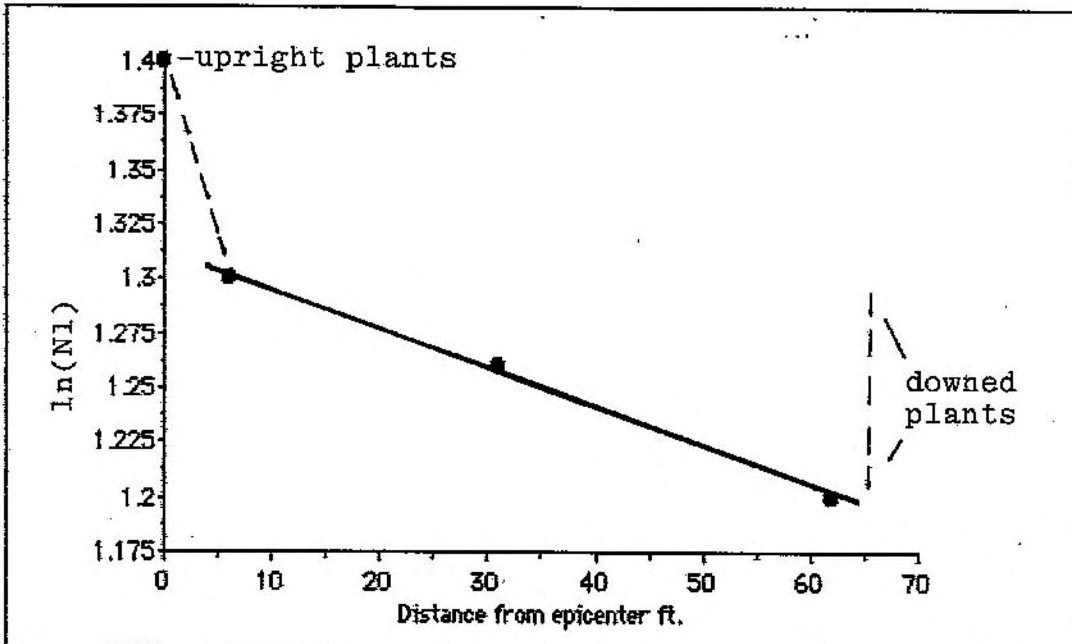


Fig.3 Relationship between ln node length and sample location within a crop formation in Chehalis, Washington, 1994 (KS-02-66)



Linear regression for three downed plant groups r=0.99

For controls ln(N1)=1.08 (N=39)