TABLE 1 (*Continued*)

Patient	Marrow aspiration	Other	Iron turnover rate (half-time in hr)	Plasma iron concentration (μg %)	Period of follow-up
W. B.	Hypoplasia ā rx* N. C.	N. C.†	1.0 ā rx 0.5 at 3 hr 1.1 at 7 days	65 ā rx 41 at 3 hr 40 at 7 days	5 wk died
J. F.	Normal ā rx N. C.	Free HCl: 55° ā rx 0° at 1 day 41° at 7 days	0.4 ā rx 0.5 at 3 hr 0.7 at 7 days	49 ā rx 43 at 3 hr 58 at 7 days	5 wk died
D. R.	Normal ā rx Hypoactive at 7 days	N. C.	2.0 ā rx 1.1 at 1 day 1.5 at 7 days	68 ā rx 112 at 7 days 89 at 51 days, 18 at 66 days	4 months living
R. F.	Normal ā rx Hypoactive at 7 days Normal at 36 days	Icterus: 2–5 ā rx 14 at 4 days 2–4 at 8 days	0.7 ā rx 0.7 at 1 day 7 days and 35 days	150 ā rx 75–85 at 1–23 days 150 at 29 days	3 months living
G. S.	Normal ā rx Greatly decreased at 21 days	N. C.	0.8 ā rx 0.8 at 1 day 3.0 at 8 days	93 ā rx 73 at 1 day, 59 at 8 days 45 at 17 days, 27 at 24 days	Deteriorating at 27 days signed out
J. P.	Normal ā rx N. C.	N. C.	1.1 ā rx 1.2 at 1 day 0.9 at 7 days 0.8 at 35 days	85 ā rx 75–100 at 1–36 days 38 at 44 days	4 months living
M. B.	Normal ā rx Increased cellularity at 15 days	N. C.	1.0 ā rx 1.1 at 1 day 0.6 at 8 days	85 ā rx 72 at 8 days 33 at 23 days, 85 at 38 days	4 months living
J. A. H.	Normal ā rx N. C.	N. C.	1.2 ā rx 1.2 at 1 day 1.2 at 7 days	123 ā rx 121 at 1 day 83 at 7 days	7 days signed out
A. M.	Normal ā rx N. C.	N. C.	0.7 ā rx 0.6 at 1 day 0.5 at 7 days 0.6 at 36 days	85 ā rx 55–65 at 4–30 days 47 at 36 days	3 months living
J. E. H.	Not done	Not done	1.1 ā rx 0.9 at 1 day 0.6 at 8 days	123 ā rx 82 at 1 day 115 at 8 days	11 days died

* ā rx before treatment.
† N. C. no significant change.

symptoms. One patient stated (J.F.) that he felt much better for 2 days following the treatment.

The data is summarized in Table 1. Except for the few changes mentioned specifically, there were no alterations in plasma proteins, serum bilirubin, reticulocytes, or gastric acidity.

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Aural Detection of Grain Infested Internally with Insects

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The detection of internal or hidden insect infestation in grains by electronic means was suggested before modern electronic techniques were available (*1*), but no useful developments of this kind have occurred. Our study of this application, which is one of a continuing series of investigations at this station aimed at developing inspection techniques for internally infested grain (2–5), has indicated that it may have considerable practical utility and, in addition, potentialities as a research tool for the insect physiologist concerned with the movement and feeding habits of insects which infest grain kernels internally.

The techniques and equipment are simple. The only major equipment requirement, in addition to a low noise level audio amplifier, a suitable microphone, and a loudspeaker, is a soundproof box. Our best results have been obtained with a concrete box having walls

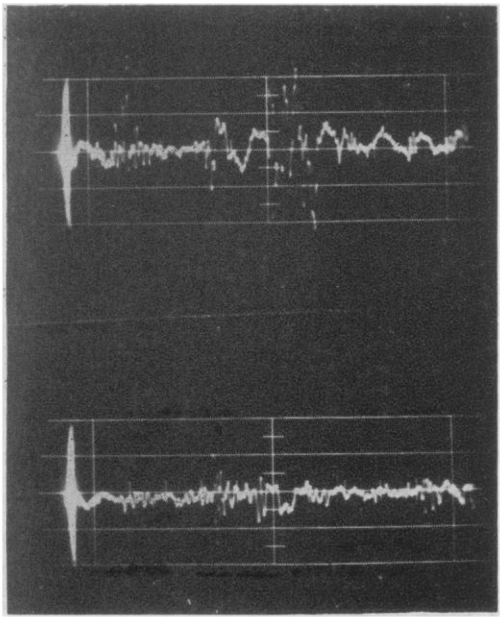

FIG. 1. Oscilloscope patterns of noises of internal infestation in wheat grains.

and removable cover 2½ in. thick, within which boxes of copper and Celotex surrounded the infested grain lying on the microphone. Records of wave patterns were made with a Tektronix oscilloscope and a Polaroid-Land camera attachment. Insects in the larval, pupal, and adult stages can be detected within the infested kernels, although the egg and extremely early stages of larval growth cannot. It appears that the larva must be nearly a week old before sufficient noise is produced for detection. In this research the stage of the infestation hidden within the grain kernels could be selected for study by means of x-ray techniques previously developed at this station (*3*).

Two distinct types of sound are associated with the larval and pupal stages, namely, a low-frequency scraping noise and a high-frequency tearing or rasping sound. From repeated observations it has been deduced that the low-frequency sounds are made by the movement of larva and pupa within the kernels, and the high-frequency sounds by the chewing of the endosperm of the grain by the larva. When several infested kernels are placed on the microphone, combinations of these frequencies may appear as shown in Fig. 1. Figure 1 was taken with the oscilloscope set at a sweep frequency of about 30 cps, and the insect sounds of both high and low frequencies are present. Thus in the upper trace the right and left ends show the low noise frequencies centering around 200 cps, characteristic of insect movement. Just to the right of the vertical scale in the center appears a high frequency burst of sound in the range of 1200–1500 cps. The frequency range of sounds due to internal insects appears to range from 200 to 8000 cps, although the lower limit has not been accurately determined. The voracious eating habits of the larval stage of rice weevil (*Sitophilus oryza* L.) has been clearly confirmed by this technique. It was also of interest to learn that, when the infested grains are disturbed in any way, the high-frequency sounds indicative of chewing usually cease and the low-frequency sounds, due apparently to movement, continue intermittently. After a short time the high-frequency sounds reappear. An experienced observer can estimate the approximate stage of development of the insect because the sounds are slightly different in the larval and pupal stages. This observation has suggested analysis of the recorded sound wave patterns as a means for differentiating developmental stages as well as physiological activities. Additional studies now in progress include evaluation of the method to determine numbers of infested kernels on the basis of cumulative recording of wave peaks, analysis of differences in sound characteristics of different species which infest grain internally, relationship of frequency of feeding and movement to stage of insect development, and determination of the influence of storage temperature and humidity on the nature, frequency, and periodicity of the sound patterns produced.

One practical application of this work is a means for the rapid evaluation of the effectiveness of fumigants whereby the normal delay of several weeks required for emergence of surviving insects, now necessary to determine fumigant efficiency, can be eliminated. A suitable sound detection device for performing such tests in mills and grain elevators is now under construction. Another application of the principle would be a means for monitoring grain within storage bins for infestation without sampling or removing the gain from the bins, in much the same manner as permanent thermocouple systems are now used for checking the heating of grain in storage.

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Estrogenic Activity of Isoflavone Derivatives Extracted and Prepared from Soybean Oil Meal[1]

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Implantation of diethylstilbestrol (synthetic estrogenic substance) pellets under the skin of cattle and sheep stimulates live-weight gains and increased feed

[1] Journal Paper No. J-2262 of the Iowa Agricultural Experiment Station, Ames, Iowa Project 1208.