

COMMUNICATION TO THE EDITOR

A Test for Stinkbug Damage in Wheat

DEAR SIR:

In parts of Europe, Asia, and Africa, stinkbugs of the genera *Eurygaster* and *Aelia* often damage wheat in the field. These insects feed on the green wheat plants in the early spring and later attack the grain in the heads. They pierce immature kernels with their proboscises and are said to inject proteolytic and diastatic enzymes into the kernels to aid in their feeding.

Examination of a mature wheat kernel that has been damaged by the stinkbug reveals a black speck on the surface, surrounded by a yellow areola which is particularly noticeable in dark vitreous wheat. The black speck is the point at which the proboscis entered the kernel, and the areola is the portion of the kernel believed to be severely damaged.

Brooke (1) states that as little as 1 or 2% of stinkbug-damaged kernels may injure the baking quality of wheat, depending on the severity of the damage in the damaged kernels. Much larger quantities of damaged kernels are often found in wheat from fields where the infestation was heavy. Dough made from flour from stinkbug-damaged wheat has lost much of its elasticity and is sticky or slimy.

Several European laboratories have observed that the extent of stinkbug damage may be roughly estimated by means of the alveograph. When flour from stinkbug-damaged wheat is used, the dough characteristics as measured by the alveograph undergo marked changes when the dough is allowed to stand for 3 hr. at room temperature before testing. It is assumed that these changes are the result of the proteolytic enzymes introduced by the stinkbug, which have an opportunity to act on the gluten of the dough during the 3-hr. standing period.

In view of this observation it was postulated that similar changes in the gluten protein of stinkbug-damaged wheat might be measured by the wheat sedimentation test (2), if the hydration time were to be extended sufficiently beyond the usual 5 min.

Three samples of Austrian wheat containing approximately 1, 2, and 4% of stinkbug-damaged kernels were obtained through the courtesy of the European Office of Great Plains Wheat, Inc.

Sedimentation tests were made on the samples as received and also after removal of all kernels that appeared to be stinkbug-damaged.

The standard AACC procedure was used except that, in addition to the standard 5-min. hydration time, hydration times of 30, 60, 120, and 180 min. were used.

The sedimentation values at various hydration times of the three samples of wheat containing stinkbug-damaged kernels, as well as of the same samples after removal of the damaged kernels, are shown in Table I.

TABLE I
SEDIMENTATION VALUES WITH INCREASING HYDRATION TIME OF WHEAT SAMPLES
BEFORE AND AFTER REMOVAL OF THE STINKBUG-DAMAGED KERNELS

STINKBUG-DAMAGED KERNELS IN ORIGINAL SAMPLE (APPROXIMATE)	HYDRATION TIME	SEDIMENTATION VALUE		
		Original Sample	Decline after Hydration	Damage-Free Fraction
%	min.		%	
1	5	38		38
	30	41		41
	60	38		42
	120	32		40
	180	28	26	41
2	5	34		35
	30	33		38
	60	28		38
	120	18		41
	180	14	59	40
4	5	42		52
	30	41		57
	60	33		55
	120	24		53
	180	15	64	49

Experience has shown that with normal sound wheat, increasing the hydration time of the sedimentation test up to several hours beyond the usual 5-min. time usually either has no appreciable effect or else results in an apparent increase in sedimentation value. The performance of the three samples of wheat included in this study, after removal of the stinkbug-damaged kernels, conformed with this pattern of behavior. The original samples containing approximately 1, 2, and 4% of stinkbug-damaged kernels, however, all showed very large losses in sedimentation value when the hydration time was increased up to 180 min.

These results provide preliminary evidence that the sedimentation test using two hydration times, such as 5 and 180 min., may prove to be a convenient and sensitive means of measuring the extent of stinkbug injury to wheat. Determination of the actual percentage of stinkbug-damaged kernels might be expected to be a less useful procedure, be-

cause these damaged kernels are sometimes difficult to see and also because the degree of damage among the damaged kernels is likely to be quite variable.

June 7, 1965

W. T. GREENAWAY

M. H. NEUSTADT

LAWRENCE ZELENY

Standardization and Testing Branch
Grain Division
Consumer and Marketing Service
U.S. Department of Agriculture
Beltsville, Maryland 20705

Literature Cited

1. BROOKE, C. L. A new bug peril in wheat fields of foreign lands. *Northwest. Miller and Am. Baker* 13: 578-579 (1936).
2. PINCKNEY, A. J., GREENAWAY, W. T., and ZELENY, L. Further developments in the sedimentation test for wheat quality. *Cereal Chem.* 34: 16-25 (1957).