where it is intimately related to the areas of reabsorption; it should therefore be considered that this enzyme plays an important part in this mechanism.

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References

1. F. Schajowicz and R. L. Cabrini, *J. Bone and Joint Surg.* 36B, 474 (1953).
2. B. S. Walker, *Am. J. Clin. Pathol.* 24, 807 (1954).
3. G. Gomori, *Stain Technol.* 25, 81 (1950).
4. J. F. Burton, *J. Histochem. and Cytochem.* 2, 88 (1954).

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Transmission of Internal Cork of Sweet Potato by the Cotton Aphid, Aphis gossypii Glover

Rankin (*1*) reported that *Myzus persicae* (Sulzer) and other aphids are probable vectors of internal cork of sweet potato. However, results from repeated tests with *M. persicae* were not always consistent when roots from test plants were indexed after one season. Hildebrand and Smith (*2*) reported aphid transmission of internal cork; they used various leaf symptoms as criteria of the disease. Sheffield (*3*) reported a disease of sweet potato from East Africa which she designated virus B and suggested its similarity to internal cork of sweet potato in the United States. She reported spread of this disease from sweet potato to sweet potato by the white fly, *Bemisia tabaci* (Genn).

Because *Myzus persicae* is virtually absent in sweet potato fields of Louisiana when much of the infection takes place, an intensive study was begun in 1955 to find a vector responsible for spread of the disease. The prevalence and occurrence of insects associated with sweet potatoes in the mother beds and in the fields was determined in 1956 and 1957. Weekly collections of aphids were made on tanglefoot traps placed in fields 1 foot above the growing vines (*4*). Insects also were collected from vines in the major sweet-potato-growing areas at weekly intervals.

Aphid species coinciding in greatest numbers with plant infection (*5*) were the cotton aphid, *Aphis gossypii* Glover, and the cowpea aphid, *Aphis medicaginis* Koch, other species being relatively few in number. When these two species of aphids were caged on sweet potato leaves, all cowpea aphids perished within 24 hours. The cotton aphids showed signs of discontent, with much probing and moving about. Nevertheless, they managed to survive for 7 to 10 days but did not reproduce. From these and other data it was surmised that the cotton aphid might transmit a virus of a nonpersistent nature in the vector (*6*) from sweet potato to sweet potato.

The following tests were made to determine the possible relationship of certain insect species to transmission of the disease. Eleven insect-proof cages made of 32-by-32-mesh Saran screen were used. Under each cage four cork-free plants (*7*) and one cork-affected plant were set on 9 August 1956. Insects were released into the cages during the first week of September. The species used and the number released per cage are shown in Table 1. In some cages combinations of certain species of insects were used in an attempt to obtain data on a possible complex of viruses. Plant material for 1957 plantings was obtained by cutting vines from the plants in each treatment prior to freeze injury in December 1956. These vines were maintained in the greenhouse until plants were set in June 1957. Some of these plants were grown in the field and were, therefore, subject to infestation by various insect species. The remainder were grown in a 32-by-32-mesh Saran screenhouse free from insects.

Results of these tests (the root-lesion indexing method was used for determining internal cork) are given in Table 1. The data clearly demonstrate that *Aphis gossypii* transmitted an agent, or agents, which resulted in the development of internal cork lesions in the roots of a cork-free stock of the Unit I Porto Rico variety of sweet potato. This was the only species involved which was capable of transmission of the disease under the conditions of this test. Furthermore, the data indicate that virus concentration in the plant must reach a high threshold level before lesions develop extensively in the roots.

Work is continuing to determine whether other viruses and insect species may be involved. It is considered possible that more than one virus may be present before cork lesions appear in the roots.

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Table 1. Data showing transmission of internal cork of sweet potato by the cotton aphid. Roots were examined for cork lesions by slicing into transverse section approximately 1/16 in. thick. For comparative purposes, the mean percentage of roots with lesions from originally cork-affected plants in each cage was determined (20 percent in 1956; 24 percent in 1957).

Insect species used	Grown in 1956			Grown in 1957			
				Uncaged field planting		Caged in screenhouse	
	Cages in 1956 (No.)	Roots examined (No.)	Roots with lesions (%)	Roots examined (No.)	Roots with lesions (%)	Roots examined (No.)	Roots with lesions (%)
50 *Aphis gossypii* + 100 *Empoasca* spp.	1	16	6.3	60	5.0	3	0
50 *Aphis gossypii* + 15 *Draeculacephala* sp.	1	10	0	75	9.3	6	50.0
50 *Aphis gossypii*	3	47	4.3	252	7.5	85	23.5
100 *Empoasca* spp.	2	19	0	123	3.3	29	0
15 *Draeculacephala* sp.	1	13	0	25	0	6	0
100 White flies, unidentified, from *Jacquemontia* sp.	1	16	0	83	2.4	5	0
None—check	2	43	0	190	1.6	26	0

References and Notes

1. H. W. Rankin, *Phytopathology* 40, 790 (1951); *Univ. Georgia Coll. Agr. Ann. Rept.* (1951), p. 57; *Phytopathology* 42, 287 (1952).
2. E. M. Hildebrand and F. F. Smith, *Phytopathology* 46, 468 (1956).
3. F. M. L. Sheffield, *ibid.* 47, 582 (1957).
4. Aphid identifications were made by H. B. Boudreaux, Louisiana State University.
5. A paper describing the data pertaining to incidence of insects and timing of infection is in preparation.
6. W. J. Martin and E. J. Kantack, *Louisiana Agr. Expt. Sta. Quart. Rept.*, in press.
7. The cork-free plants used in these tests were an isolation stock of the Unit I Porto Rico variety in which internal cork lesions have never been found. It is not certain that this stock is free of all viruses.

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