Table 3. Radiocarbon ages and altitudes of peat samples from Chesapeake Bay borings (*12*).

Laboratory No.	Altitude	Age (years ago)
ML-91	−89	14,870 ± 200
ML-89	−85	11,180 ± 150
ML-90	−82	9,930 ± 130

weathered that their age may be no older than Sangamon.

Our detailed mapping verifies the hypothesis of Moore (*14*) that in southeastern Virginia the Wicomico and Sunderland "terraces" of Wentworth (*5*) are both underlain by the Sedley and Kilby formations. Moore believed that the Kilby Formation underlying the Wicomico "terrace" is of marine origin, but we believe that the Kilby Formation is of fluvial origin throughout. It can be traced through the Surry scarp, the boundary which Moore used between supposedly marine Kilby and supposedly nonmarine Kilby. No changes other than a gradual increase in altitude of the basal cobble zone and a slight increase in grain size occur from east to west across the scarp. Because the Surry scarp is cut into the Kilby Formation it must be younger than the Kilby.

Similarly, Wentworth supposed that the sea which cut the Suffolk scarp also simultaneously fashioned a wave-cut bench seaward of it and deposited upon this bench a single marine formation, the Pamlico "terrace-formation," presumably in a shallow open-shelf environment. Although marine deposits do lie east of the Suffolk scarp, only one unit, the Norfolk Formation, can be ascribed to shallow open-shelf conditions. Furthermore, the Norfolk Formation is overlain by sediments of two younger depositional cycles which are products of barrier-island and lagoon environments, the Londonbridge and Sandbridge formations, and by the Kempsville Formation, a beach deposit. The Norfolk Formation also overlaps two other formations, the Great Bridge and North Landing formations, which are lagoon and littoral deposits confined entirely to areas east of the Dismal Swamp. With the possible exception of the surface underlying the Norfolk Formation near the Suffolk scarp, and the surface underlying the Kempsville Formation near the Hickory scarp, no wave-cut "bench" can be identified between these formations; instead, their surfaces of contact are irregular and show evidence of oxidation. Undoubtedly they are depositional surfaces modified by stream erosion.

Our stratigraphic studies, based on outcrops and drilling, show that the older concept in southeastern Virginia of terraces and open-shelf, shallow-marine "terrace-formations" is completely erroneous. The area formerly thought to comprise the Pamlico and Princess Anne terraces is actually underlain by a complex of at least seven marine, littoral, and lagoon formations. The so-called Wicomico and Sunderland terraces prove to be underlain by the non-marine Sedley and Kilby formations which extend under both of them.

The term "terrace," as used in a morphologic sense along the Atlantic Coastal Plain, has acquired a genetic implication which is invalid in the area we studied. We believe that the term "plain" (*15*) is more appropriate than the term terrace, and that different names should be used for stratigraphic units to distinguish them from morphologic features such as plains, swales, scarps, and rises. In line with this principle we have not used "Pamlico," "Wicomico," and "Sunderland" as formation names. In our judgment further application of these terms will hinder progress in study of Pleistocene coastal stratigraphy because of the genetic implications which have become associated with them through long usage (*3, 5–7, 16–18*).

Finally, we emphasize that study of stratigraphy gives better control on the extent of Pleistocene submergences and emergences, and produces a more accurate and complete geologic history than can be obtained from morphologic study alone (*19*).

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Fatty Acids: In vivo Synthesis by the Green Peach Aphid, Myzus persicae (Sulzer)

Abstract. *After feeding through an artificial membrane on an 18 percent sucrose solution containing either acetate-1-C^{14} or uniformly-labeled glucose-C^{14},* Myzus persicae *incorporated 75 percent of the carbon-14 into palmitoleic, stearic, and oleic acids. Small amounts were incorporated into myristic, linoleic, and linolenic acids; no significant amounts were incorporated into the short-chain fatty acids.*

A recent technique (*1*) for feeding aphids substantial amounts of liquids through an artificial membrane now makes the study of aphid nutrition feasible. The use of radioisotopes to study an insect's nutrition provides results in general agreement with the classical deletion method (*2*), and it has been used to determine the amino acid requirements of an insect which cannot

Table 1. Distribution (percentages) of radioactivity in the fatty acids (*11*) of *Myzus persicae* artifically fed on 18 percent sucrose solutions labeled with C^{14}. The total activity recovered, in counts per minute, was 72.1, 6741, 2487, and 299, respectively, in experiments 1, 2, 3, and 4. N.S., activity not significantly above background.

Expt. 1*	Expt. 2†	Expt. 3*	Expt. 4*	Expt. 1*	Expt. 2†	Expt. 3*	Expt. 4*
	Caproic, C_6				*Palmitoleic*, $C_{16:1}$		
N.S.	N.S.	0.70	N.S.	23.00	14.50	20.05	14.90
	Pelargonic C_9; *Capric*, C_{10}				*Stearic*, C_{18}		
N.S.	N.S.	4.42	N.S.	23.82	11.43	24.90	23.15
	Lauric, C_{12}				*Oleic*, $C_{18:1}$		
N.S.	0.57	1.16	1.19	28.95	41.59	29.04	26.62
	Myristic, C_{14}				*Linoleic*, $C_{18:2}$		
6.48	16.90	4.80	3.26	4.59	3.39	3.36	3.54
	Palmitic, C_{16}				*Linolenic*, $C_{18:3}$		
4.26	5.21	5.46	9.92	6.73	4.84	3.87	10.76

* Only live aphids feeding on the membrane at the end of the feeding period were analyzed. † All aphids in the cage (alive as well as dead) used for the analysis.

be reared on a chemically defined diet (*3*). Nothing is known concerning the fatty acid requirements of aphids; hence, this investigation was conducted to determine which fatty acids the green peach aphid (*Myzus persicae*) was able to synthesize in vivo.

In four separate experiments, approximately 75 fourth instar or apterous adult aphids were placed in each of six feeding cages and were allowed to feed for 36 to 48 hours through a Parafilm "M" membrane (*4*). In three experiments, the aphids were fed an 18 percent sucrose solution containing either 5 or 10 μc of sodium acetate-1-C^{14} per milliliter. The diet in the fourth experiment was 18 percent sucrose plus sufficient uniformly-labeled glucose-C^{14} to yield a specific activity of 40 μc/ml.

After the feeding period, the aphids were frozen and the lipid material was extracted (*5*). The procedure for preparing the methyl esters of the fatty acids and their separation by gas liquid chromatography under the conditions as in Fig. 1 has been reported (*6*). The fractions were collected and assayed (*7*).

The green peach aphid did not synthesize fatty acids that contain less than 14 carbon atoms (Table 1 and Fig. 1) except in experiment 3. The reasons for the exception are not known. Approximately 75 percent of the total radioactivity recovered was present in three fatty acids, palmitoleic, stearic, and oleic. No degradation studies were performed to ascertain how the synthesized fatty acids were labeled; thus the quantity that was synthesized is not known.

From a nutritional viewpoint, these data suggest that palmitoleic, stearic, and oleic acids are not required. If any of the other fatty acids are required, an interesting question is posed: in what form do aphids acquire lipid material? *Myzus persicae* is known to feed on sieve-tube contents (*8*); its sucking mouthparts dictate that all ingested nutrients must be either in solution or well emulsified or finely suspended. The transport of lipids in phloem tissue has not been reported, although Ziegler (*9*) detected phospholipids in the phloem sap of trees but he considered them not mobile. Mittler (*10*) has calculated that the sieve tube in which an aphid was feeding had to be refilled about 100,000 times per hour to account for the aphid's feeding rate. Considering these reports, one must conclude that, if fatty acids are required, they occur in solution (which would exclude practically all lipid material except the short-chain free fatty acids) or they are emulsified, perhaps as parts of highly mobile phospholipids or other compound lipids.

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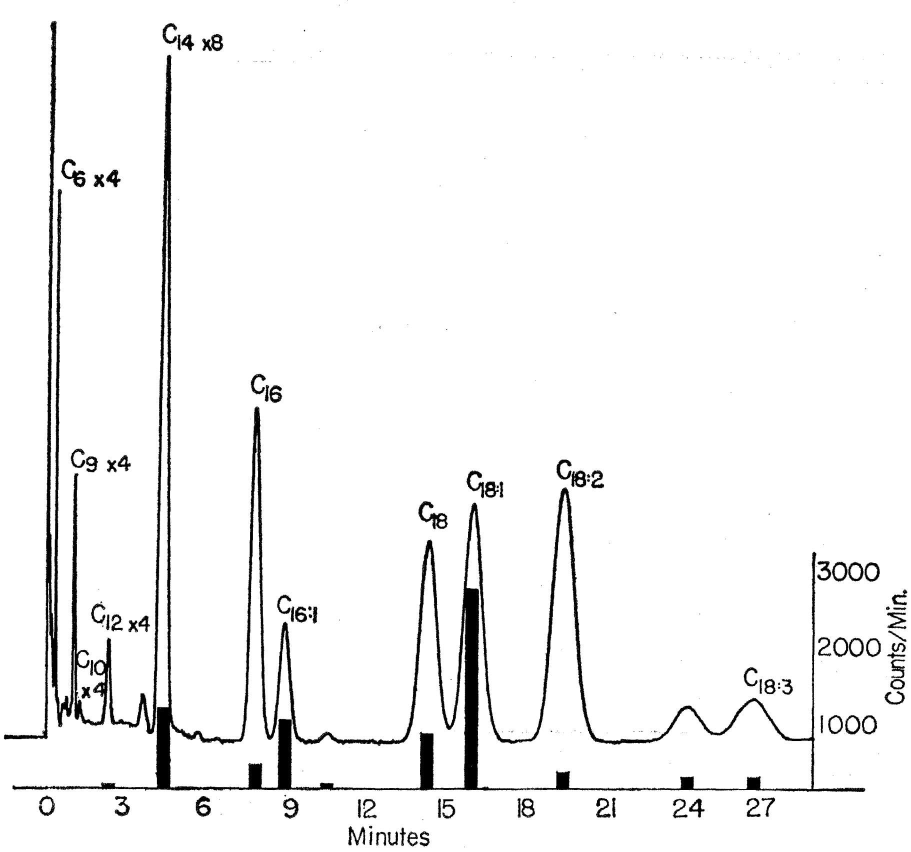

Fig. 1. Gas-liquid chromatograph of the methyl esters of fatty acids extracted from *Myzus persicae* (Sulz.) that were fed acetate-1-C^{14}. The bar graphs under the peaks represent the amount of radioactivity recovered for individual fatty acids. Column: 15 percent by weight polyethyleneglycol adipate plus 2 percent H_3PO_4 on 60/80 mesh Chromosorb W; column temperature, 205°C; carrier gas, N_2; gas flow rate, 26 ml/min; detector, H_2 flame ionization; $\times$ 4 and $\times$ 8 are attenuation factors.

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