6-12-1981

Notes on Oyster Diseases in Virginia

J. D. Andrews
Virginia Institute of Marine Science

Notes on Oyster Diseases in Virginia

J. D. Andrews

VIMS

12 June 1981

The weather continues to occur in extremes that interfere with growth and survival of oysters in the Chesapeake Bay. First there was a very wet year in 1979 (some 63-65 inches annual rainfall), much of which occurred in excessive amounts (some 15 inches) between late September and early November. Oysters in the upper James River seed-oyster area were killed by prolonged exposure to fresh or near-fresh waters in fall and winter of 1979-80.

In March 1980, while oysters were still dormant, and kept closed by fresh water, we collected Horsehead oysters for our monitoring trays in Virginia rivers. Over the next 6 weeks, we found 20 to 30% boxes and dead oysters with meats in all trays (12). Often the boxes contained rotten meats that smelled like sour milk. The edges of oyster bills were blackened by anaerobic decomposition in closed shells. However, this did not interfere with a typical MSX mortality in the survivors in the late summer of 1980.

The summer of 1980 turned very dry and this extended through the spring of 1981. The winter-spring 1980 drought was the worst ever recorded for Virginia rivers with less than half, normal, freshwater flows. Salinities now extend 10 to 20 miles above their usual boundaries. There are no salinity barriers to extension of MSX activity into all oystering areas of low salinities normally.

However, MSX did not spread appreciably above its usual boundaries in 1980 despite relatively high salinities.

The distribution of MSX from 1980 infections extends from the Piankatank River down-Bay on the western shore of Chesapeake. We have not sampled the eastern shore of Chesapeake Bay for disease prevalence. MSX did penetrate James River significantly, and it caused oyster deaths from Wreck Shoal to the James River Bridge in the fall, 1980. This is one of only two or three years in 21 that MSX killed oysters as far upriver as Wreck Shoal. Salinities never achieved the spring low of 10 °/oo that is required to permit oysters to expel MSX as usual about 1 May. After mortalities were over in November 1980, few infections remained. Seed oysters transplanted in the 1980-81 season appear not to be seriously threatened by the few 1980 infections in their new beds. However, the extent of spread of MSX in the 1981 season cannot be predicted.

Mortalities and MSX prevalences of Horsehead oysters at Gloucester Point above the bridge in the York River are shown for 1979 and 1980 in Figs. 1 to 4. Timing of infections and of mortalities were typical although death rates were above average for peak-kill periods and seasonal totals. Mobjack Bay and Hampton Roads had similar mortalities in trays.

Seaside of Eastern Shore, Virginia has exhibited a striking increase of MSX in the last 3 or 4 years. Previously, infections sometimes occurred at normal rates and times for the western shore of Chesapeake Bay. However, after a few deaths in August, infections

regressed in September and total mortality was low. With increasing intensity, MSX now kills native and Horsehead oysters in trays with a vigor that exceeds the patterns established for the western shore (Figs. 5 to 7). At first, Chincoteague Bay exceeded Swash Bay in mortalities, but in 1980 both were very high. No explanation has been found. Since no known changes of environments have occurred, one tends to speculate that the pathogen has mutated to a more virulent race.

Several years ago, we began testing lab-bred MSX-resistant oysters on Seaside for susceptibility to SSO. The results have been inconclusive because these tray-grown oysters began dying on Seaside in a persistent fashion without any obvious pattern. By the time a year had passed, after exposure to SSO, most oysters were dead. Both SSO and MSX were scarce in these oysters. Then in 1980, the mortalities increased and the patterns of kill began to resemble those of MSX and SSO. This week we found high prevalences of MSX in MSX-resistant oysters as well as Horseheads and natives. The control oysters, from the same MSX-resistant lots that were held in the York River, have shown low mortalities in the York River, and presumably low prevalences as usual. We are over a year behind schedule in processing oysters into stained slides because of lack of money. We are saving the survivors of these Seaside-selected MSX-resistant lots for possible breeding. If there is a new race of MSX, this is the way to begin studies.

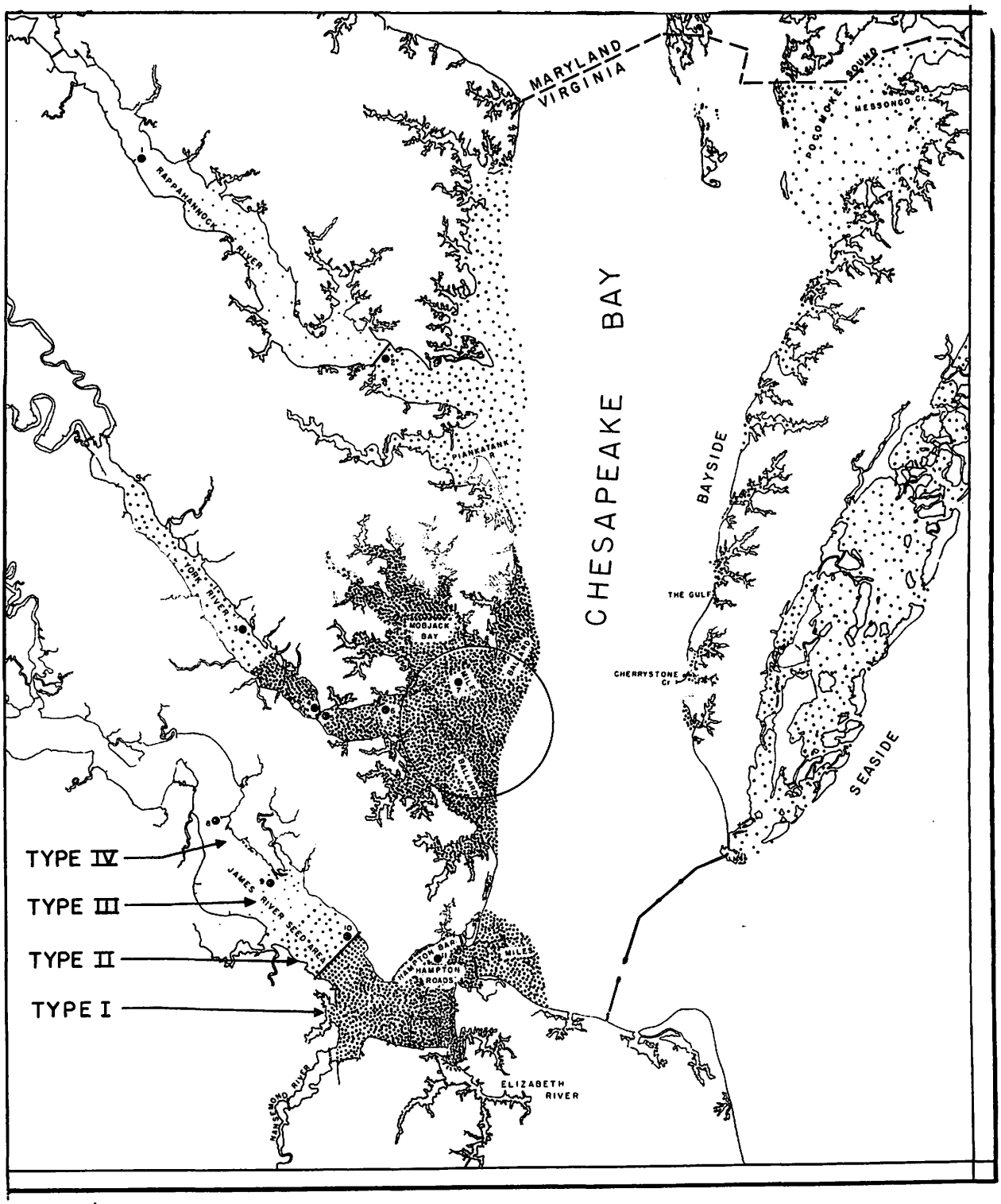

Fig. 1. Classification of Virginia oyster grounds by intensity of MSX activity in years of average salinities. Four types of areas are designated by intensity of stippling from fully epizootic areas for MSX activity every year to none in most years (no stippling). Important seed oyster and growing areas in pre-MSX years are named. Few oysters have been grown in Type I areas since 1960 because of MSX. Type II and III areas may become Type I areas in 1981 due to high salinities from a prolonged drought. Mortalities of susceptible James River seed oysters in Type I areas from MSX alone average 50% the first year and nearly as much more of survivors in the second year.

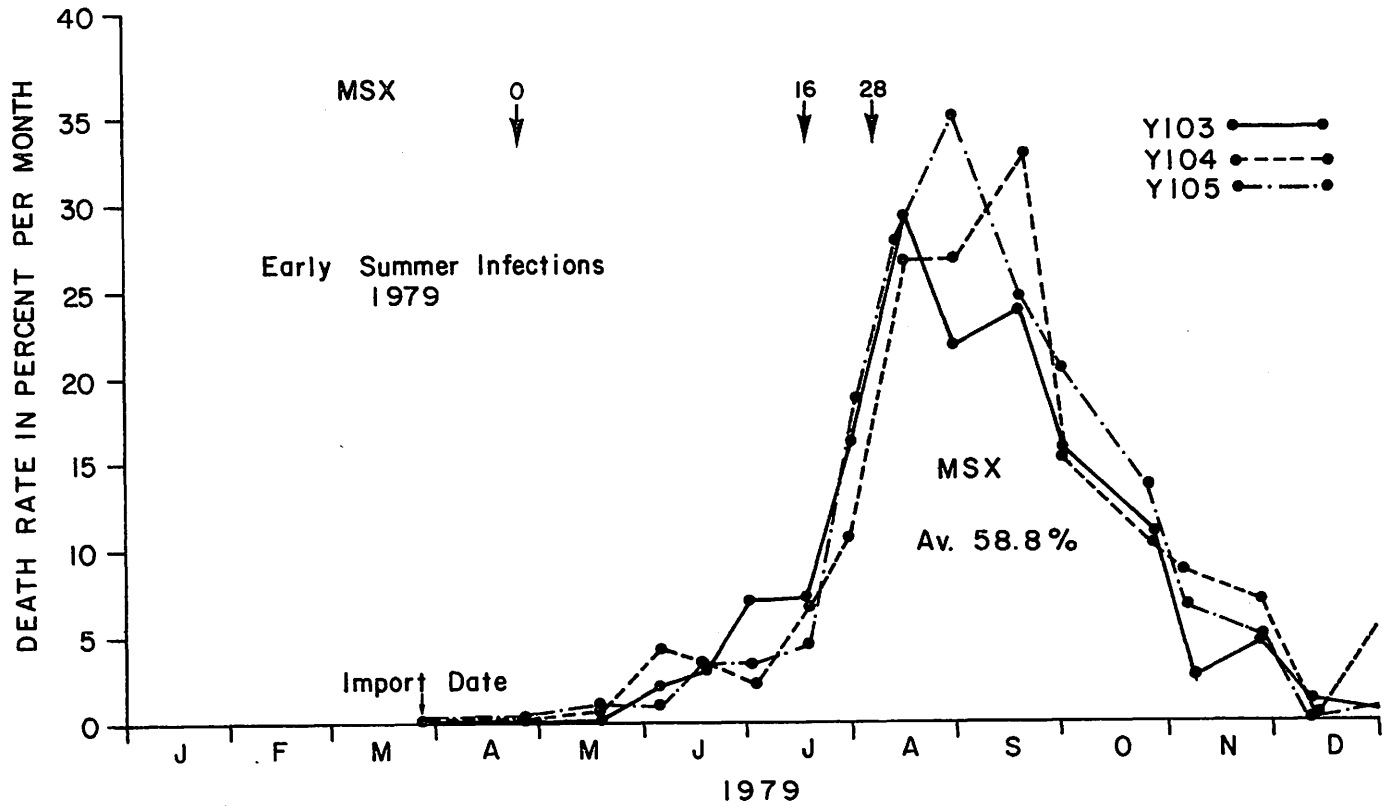

Figure 1. Monthly death rates and prevalences of MSX in susceptible James River oysters held in legged trays on a public oyster ground in York River, Va. These disease-free oysters were imported from Horsehead Rock 20 Mar. 1979. Prevalences of MSX disease in samples of 25 live oysters are given in percentages above arrows that indicate the dates of sampling.

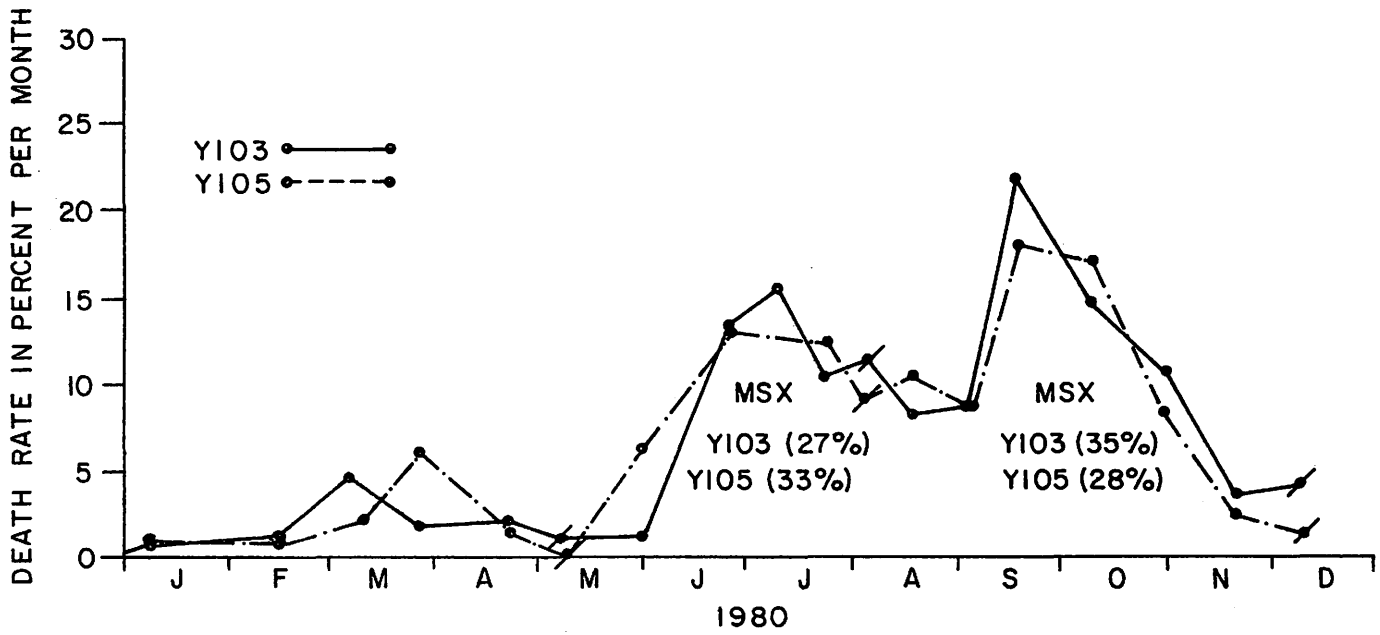

Figure 2. MSX activity for the second year (1980) of exposure is protrayed to show the timing of mortalities in June and July 1980 from late-summer (after 1 Aug. 1979) infections. In August, 1980 deaths from new, early-summer infections acquired in June, 1980 began to appear. The hash-marks show the time periods covered by mortalities from the two distinctive infection periods.

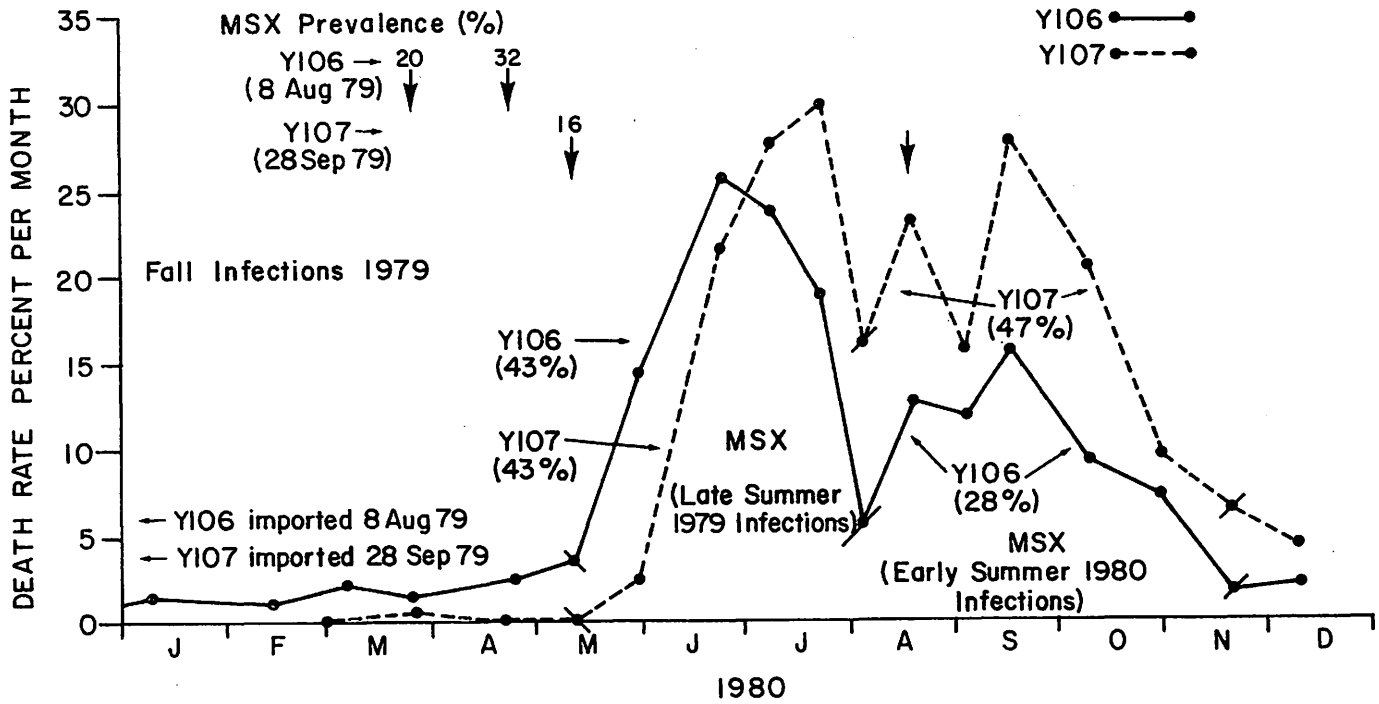

Figure 3. Mortalities from late-summer infections in 1979 and early-summer ones in 1980 are shown delineated by hash-marks. The percentages of mortality for each tray during each period of deaths are given. Note that deaths were a little later in the Horsehead oysters imported 50 days later on 28 September than the early group (8 August). Monitoring was done in trays at the York River station one-half mile above the bridge.

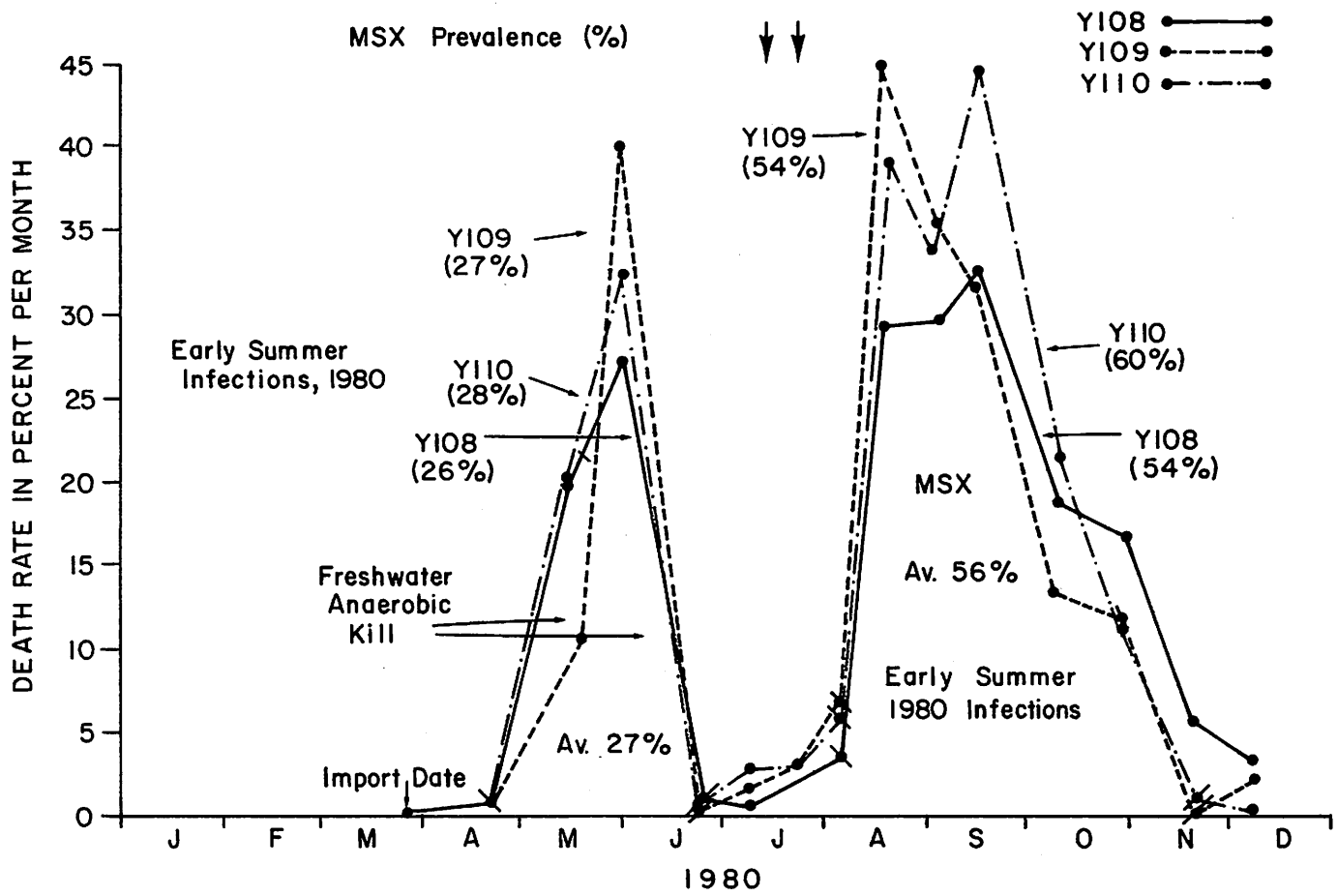

Figure 4. The lots of Horsehead Rock oysters imported in the spring of 1980 contained dead oysters killed by freshwater exposure in fall and winter of 1979-1980. The oysters died with closed shells and rotted anaerobically. The usual infections of MSX in survivors occurred in June and mortalities began in early August.

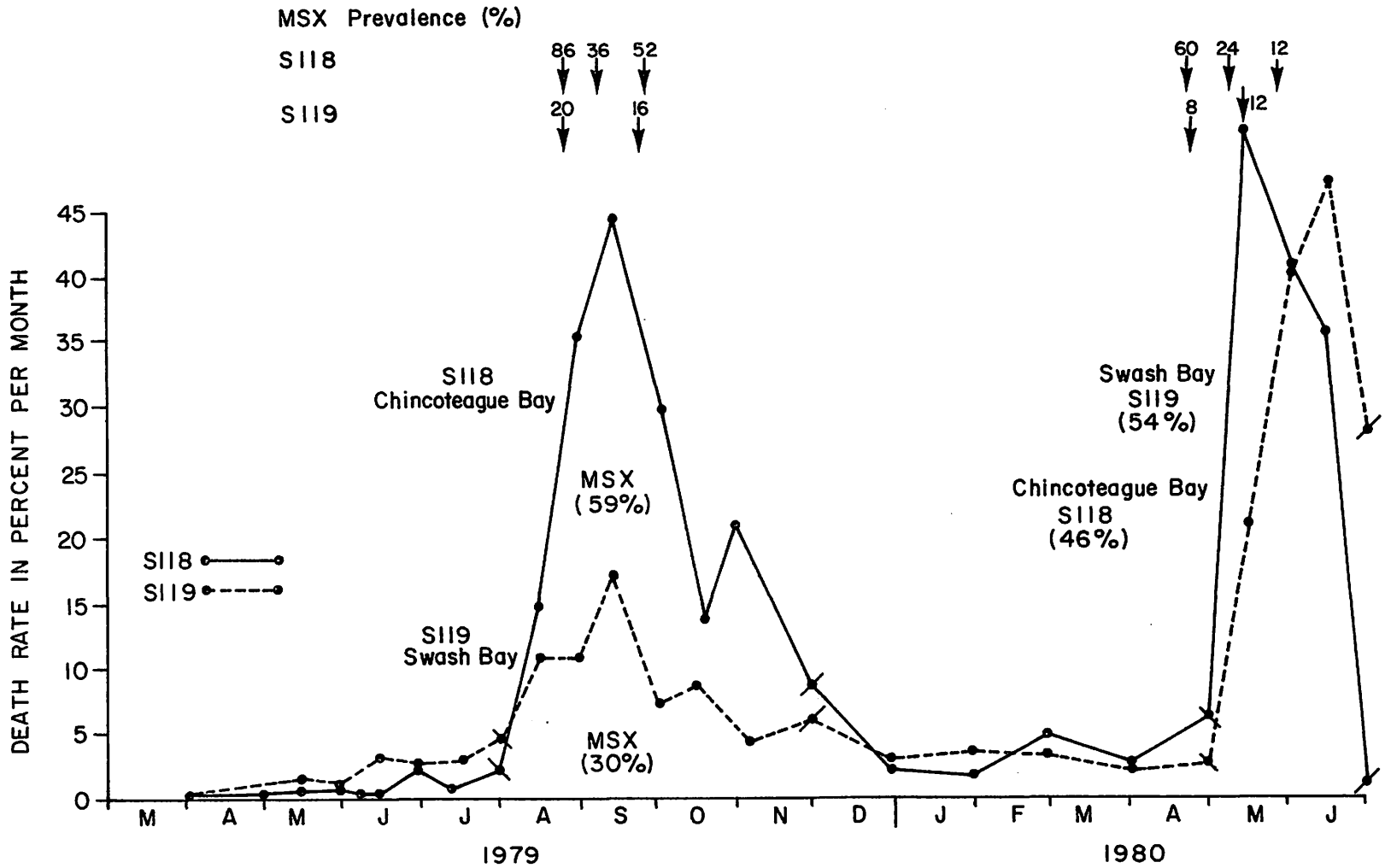

Figure 5. Horsehead Rock oysters imported to two bays on Seaside of Eastern Shore of Virginia on 3 April 1979, exhibited MSX mortalities with the same timing but variable rates of deaths. The Chincoteague Bay station in Queens Sound usually has higher prevalences and death rates than does the Swash Bay station. High rates of deaths occurred in May-June 1980, but low numbers of oysters in the trays make the patterns unreliable because of variation from one examination to another.

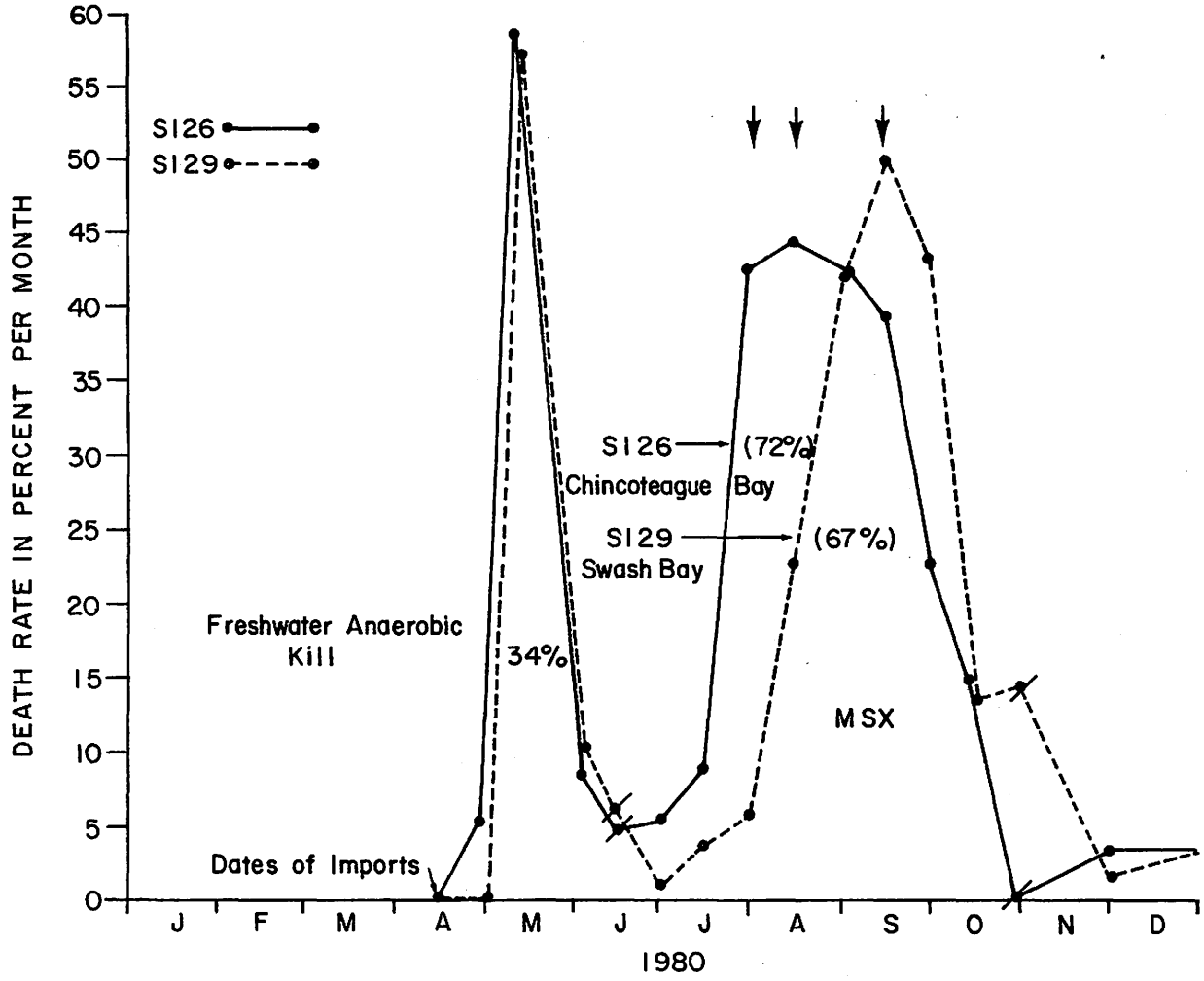

Figure 6. The Horsehead Oysters imported to Seaside in the spring of 1980 contained closed, dead oysters that were discovered only after placing in high-salinity waters. High death rates, mostly from MSX, resulted in two-thirds of the survivors dying in late-summer and fall.

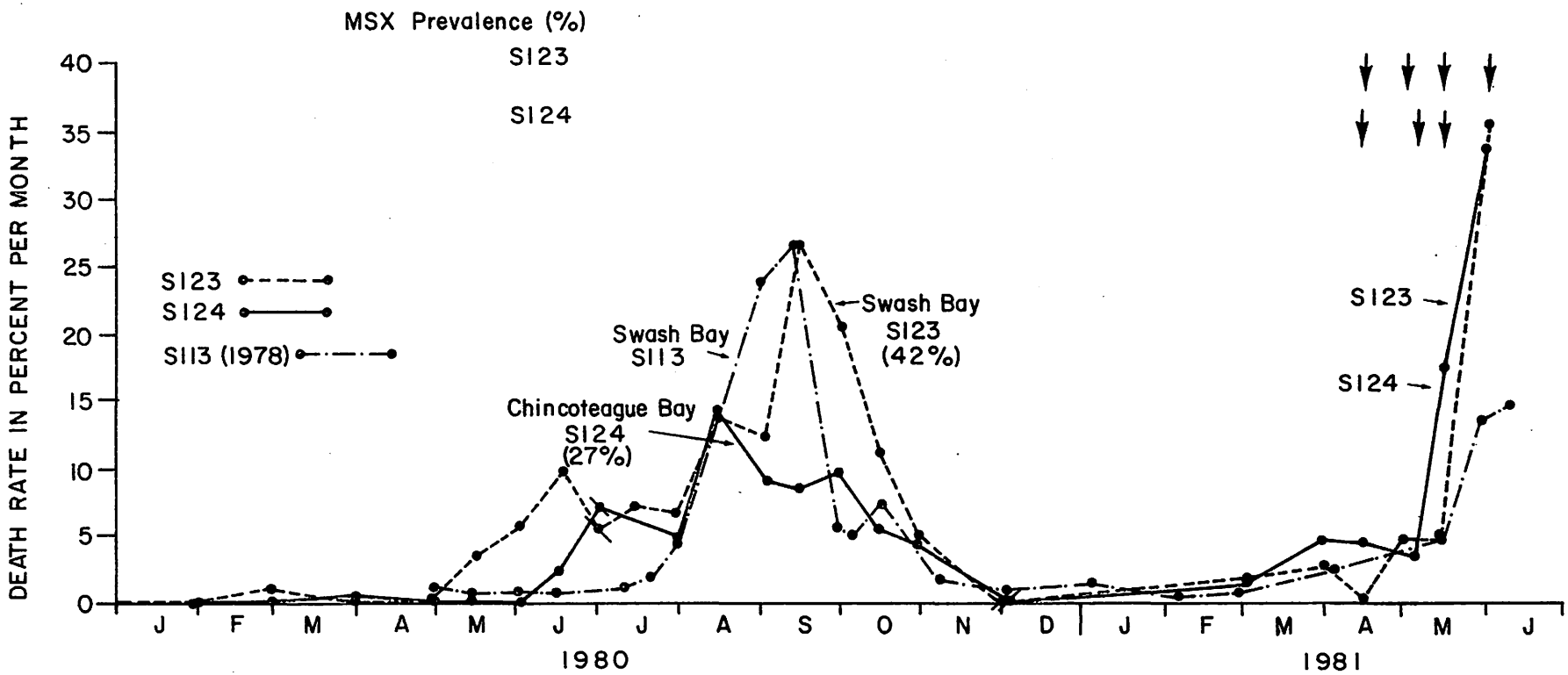

Figure 7. Lab-bred MSX-resistant oysters, tested for one year in the York River, were transplanted to Seaside in trays. The purpose was to test for resistance to the Seaside Organism (SSO). Not much MSX was found in early lots moved to Seaside, but mortalities continued throughout the warm season, with mortality patterns resembling those of MSX and SSO on Seaside.