The bloodworm, *Glycera dibranchiata*, is distributed from the Gulf of St. Lawrence to the Gulf of Mexico and from central California to lower California and Mexico. It occurs from intertidal water to 402 m depth (Pettibone 1963), but it is more abundant in shallow coastal water. In Maine and Nova Scotia the worms are dug commercially along the coast from the upper layers of the intertidal sand-silt-clay strata (Dow and Creaser 1970; Glidden 1951). 

Spawning bloodworms are briefly pelagic occurring in large numbers as they swarm in the afternoon. Creaser (1973) observed swarming in Maine during June. Simpson (1962) reported swarming both in June and November-December, suggesting a biannual swarming in Maryland. Klawe and Dickie (1957) did not observe swarming by bloodworms in Nova Scotia, although other evidence indicated that the worms spawned in mid-May. They suggested that the worms had a short nocturnal swarming period making them difficult to observe. Simpson (1962) checked this possibility.

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in Maryland by making 40 observations with a
night-light between June and November. No
worms appeared at the surface under the light.

Individual bloodworms occasionally are pelagic
when not spawning. Pettibone (1963), when not­
ing the sightings of others, reported a bloodworm
swimming at the surface of Eel pond, Woods Hole,
Mass., on the evening of 17 August 1943; another
at the surface perhaps at the same pond on 28
January 1876; and another in Delaware Bay on 29
January 1957. No time was given for the two
January sightings. On 2 October 1969, E. P.
Creaser, Jr. sighted a bloodworm at the surface
near a dock on McKown Point, Boothbay Harbor,
Maine. The large nonspawner was observed at
noon swimming during a flood tide. We have found
that nonspawning bloodworms may also occur as
fairly abundant members of the tychoplankton—
bottom dwellers that are either swept upward
with tidal currents or migrate upward at night.
This study was originally designed to sample lar­
val Atlantic herring, Clupea harengus harengus
Linnaeus, and these results will be presented la­
er. The implications of a large incidental catch of
bloodworms prompted our writing this note.

Materials and Methods

The site of this investigation, Sullivan Harbor,
is an embayment along the eastern coast of Maine.
It is divided into northern and southern sectors by
a constriction formed by an island, point of land,
and ledges (Figure 1). The southern sector opens
onto Frenchman Bay, which in turn opens onto the
Gulf of Maine. At its upper end, the northern sec­
tor constricts into a tidal falls. A narrow channel
extends north of the falls eventually bifurcating
into broad extensive shallows. Only small streams
enter these shallows about 5 km north of the
highway bridge. Sullivan Harbor is thus rela­
tively saline (31-32%).

Six sampling stations were located within the
northern sector of the harbor; two in the landward
end of the channel (No. 3, 4), two in the seaward
end (No. 1, 2), and one at each seaward entrance to
the subtidal flats (No. 5, 6). At each station within
the channel, four lines of buoyed and anchored
nets were set (Graham and Venno 1968). On each
line one net fished near the surface and a second at
3 m just above the edge (4 m) of the subtidal
channel (Figure 1). A third net fished below the edge
at 10 m and a fourth near the bottom (12-20 m). At
the entrance to the subtidal flats, one net was
suspended near the surface and another at 3 m just
above the bottom.

The nets were set at each station at dusk and
retrieved at dawn, fishing approximately one tidal
cycle. Calibrated meters centered within the nets
determined the amount of water strained. The
contents of the nets were preserved in the field
using a 5% Formalin solution. The sexes of the
worms were determined at a later date by inspec­
tion of the coelomic contents. Since variable
shrinkage of the worms made length measure­
ments unreliable, dry weight was obtained for
each worm.

Results

The nets strained 72 bloodworms from tidal cur­
rents during 6 of 10 cruises in autumn and winter
1974-75. During 1974, the nets captured 2 worms
on 14 October, 7 on 11 November, 2 on 5 December,
51 on 10 December, and 1 on 19 December. During
1975, the nets captured nine worms on 2 De­
cember. Only five worms were immature; their
weights varied from 0.02 to 0.11 g. Mature females
outnumbered mature males about two to one
(41:24). The mean weights of the two sexes were
similar, 0.57 g, and their range varied from 0.11 to
1.47 g.

Bloodworms were dispersed throughout the
water column and over both the channel and sub­
tidal flats. Nets at all stations and depths captured
worms. The average number netted was three and
ranged from one to seven. Of the 72 worms from all
cruises, nets set in the channel contained 58
worms and those over the subtidal flats held 14.
Their numbers decreased vertically: 33 near the
surface, 17 at 3 m, 15 at 10 m, and 7 near the
bottom.

An exceptionally large catch per unit effort was
obtained on 10 December. During the 10 cruises
the nets strained approximately 8,000 to 20,000
m³ of tidal water per cruise. Five of the sets yielded
catch rates varying from 0.1 to 0.7 worm/1,000 m³.
A sixth set (10 December) yielded 3.38 worms/
1,000 m³. This catch rate was sufficiently large to
permit comparison of synoptic catch rates with
location and depth. The four lines of nets in the
channel strained 39 worms from 10,194 m³, yield­
ing a catch rate of 3.8 worms/1,000 m³. Those nets

2Reference to trade names does not imply endorsement by the
National Marine Fisheries Service, NOAA.
in the flats strained 12 worms from 4,889 m³, yielding 2.4 worms/1,000 m³. Shallow nets, above the channel edge and those near the surface of the flats, captured 37 worms by straining 9,614 m³ for a catch rate of 3.8 worms/1,000 m³. Deep nets, below the channel edge and those near the bottom of the flats, captured 14 worms by straining 5,469 m³ for a catch rate of 2.6 worms/1,000 m³.

The numbers of worms captured in the nets were few when compared with the numbers of smaller tychoplankters, such as amphipods. Each individual weight, however, was relatively large compared with those individuals of more numerous taxa and suggested that a large biomass of bloodworms sometimes enters the water column of the harbor.

Discussion

The mature bloodworms captured during winter in buoyed nets at Sullivan Harbor were not free-swimming spawners. Creaser (1973) sampled a small worm flat at Wiscasset, Maine, from November 1967 to August 1969. During that time, among the many worms dug, only three spawners occurred during winter. Analysis of his collections showed that egg diameters increased somewhat during December and January but ceased growth during the colder months of February and March. Spawning was triggered in June by formation of the epitoke, the growth of eggs to the spawning "range" and a water temperature of at least 13°C. These conditions were not found in the present
study. Also, we did not detect any morphological changes that accompany formation of the epitokes as described by Simpson (1962).

Swimming bloodworms at night have also been reported for two other Maine inshore waters. Dean⁸ saw 22 bloodworms during observations made between 24 January and 29 March 1977 on 33 nights. The worms were present during five nights in March and 15 were collected under a night-light in the Damariscotta River, Maine—8 on 11 March and 7 on 12 March. The gametes of the worms were not sexually mature and the presence of the worms near the surface at night was not related to spawning. Dean also reported that buoyed and anchored nets set in Montswag Bay and the Sheepscot estuary between 1970 and present captured 22 glycerids, some of which were G. dibranchiata. In contrast, the senior author of this paper did not capture bloodworms in buoyed and anchored nets set in the Sheepscot estuary over the same time period and in the same vicinity. Possibly, the swimming of bloodworms at night is sporadic.

A recent study of residual currents in Sullivan Harbor suggested that the relatively shallow nets above the edge of the channel (Figure 1) and at the surface over the tidal flats strained a residual seaward flow transporting tychoplankters and the relatively deep nets strained a residual landward flow. Distribution of bloodworms throughout the water column would, therefore, insure their wide dispersal by horizontal tidal currents, and it is unlikely that after a tidal cycle they would regain the location of their original burrows.

We hope to study further the bloodworms of Sullivan Harbor and do not wish to speculate on their origin or fate at this time. Rather, it is our purpose to suggest that researchers investigating bloodworms within their bottom habitat should also examine their possible role as tychoplankters for two reasons: populations of this important commercial species in separate flats may become intermixed, introducing problems in their management; and the reestablishment of worm populations previously destroyed by pollution or other environmental catastrophe might proceed more rapidly in those areas where there is winter transport of mature worms, as well as the "normal" dispersion of late spring larvae.

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⁸Dean, D. The swimming of bloodworms (Glycera spp.) at night. Unpubl. manusc.