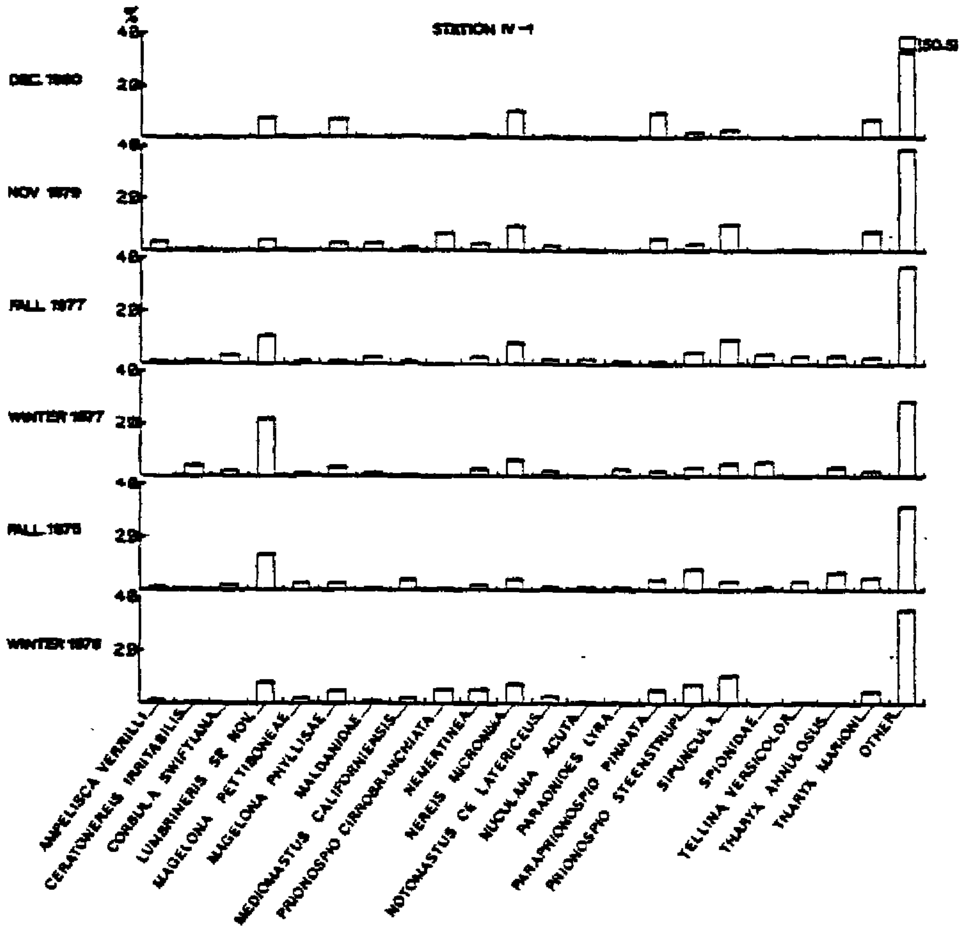

Figure 4-31. Relative proportions of numbers of individuals of numerically dominant taxa at Station IV-1, by sampling period (1% cutoff).

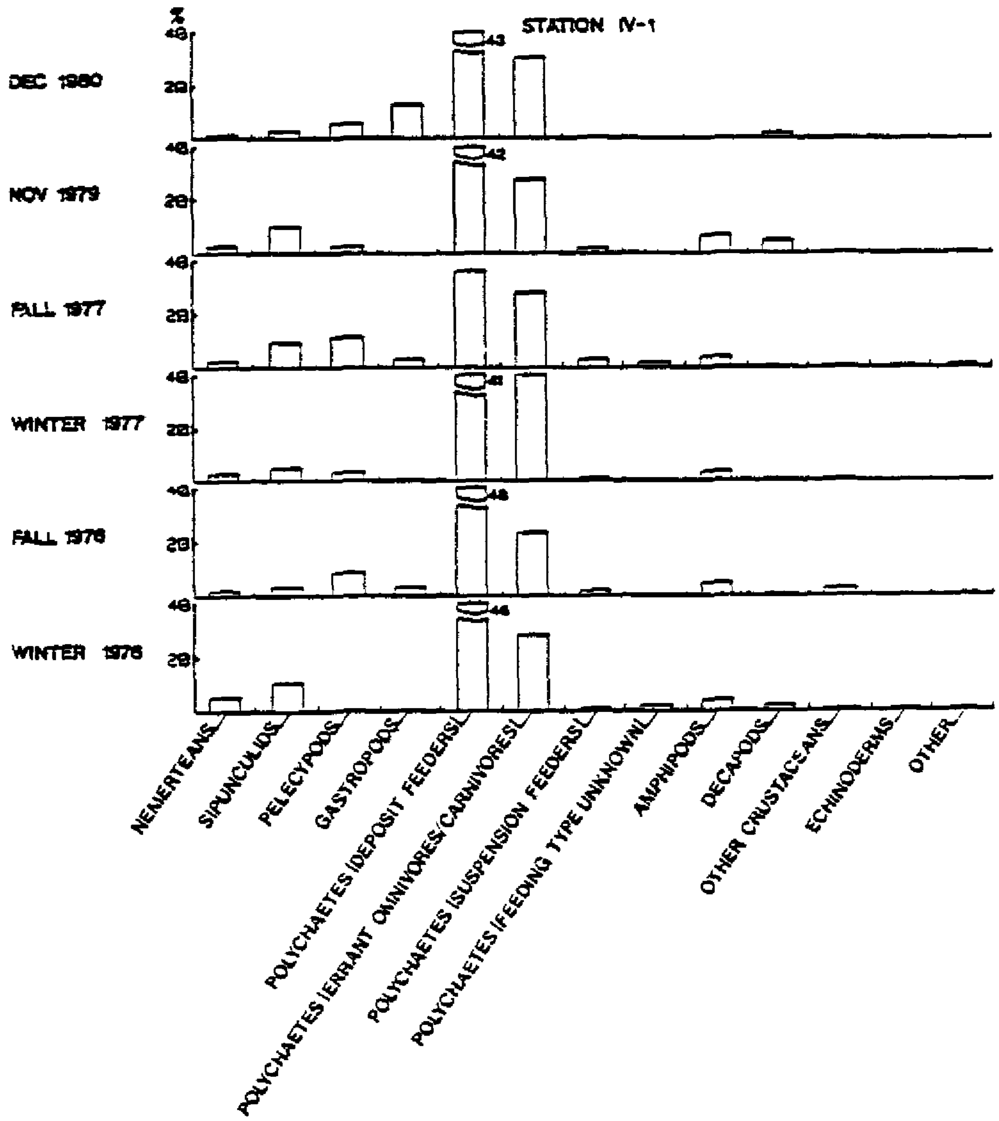

Figure 4-32. Relative proportions of numbers of individuals of major groups of numerically dominant taxa at Station IV-1, by sampling period (1% cutoff).

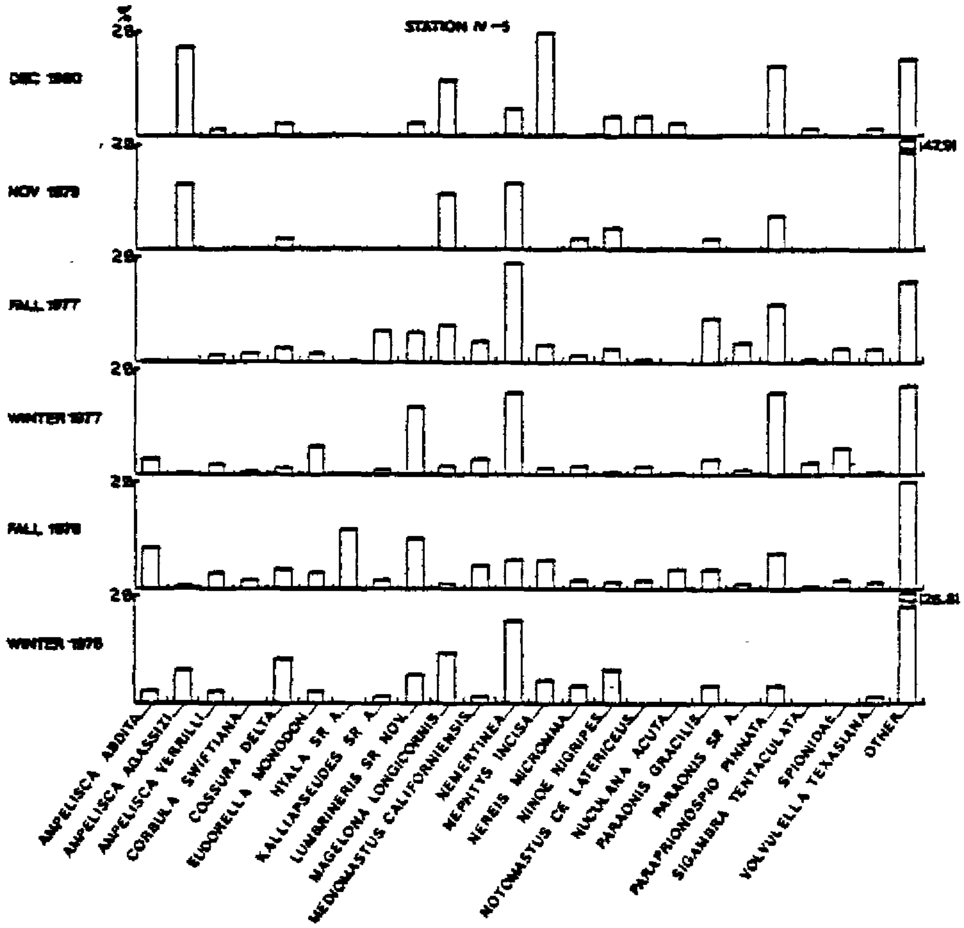

Figure 4-33. Relative proportions of numbers of individuals of numerically dominant taxa at Station IV-5, by sampling period (1% cutoff).

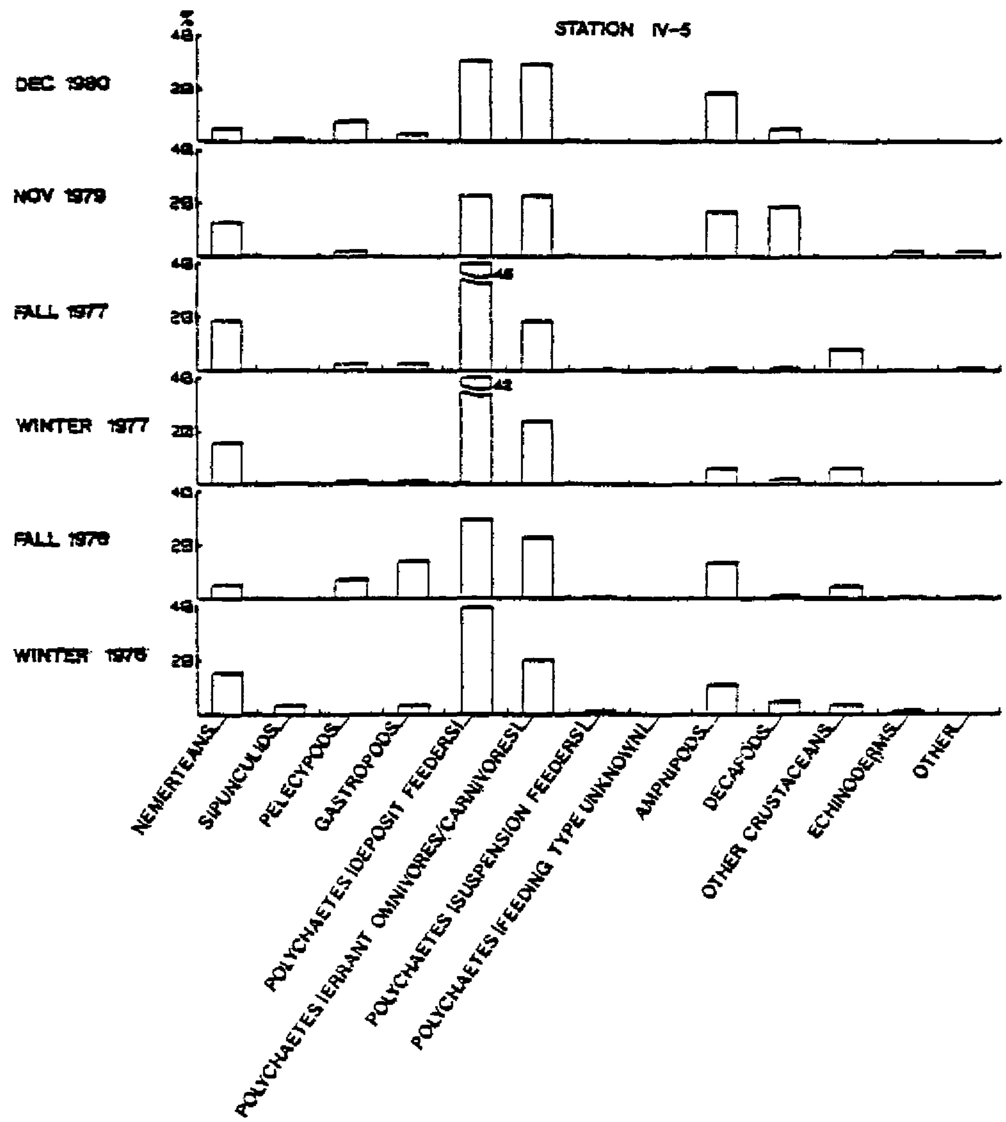

Figure 4-34. Relative proportions of numbers of individuals of major groups of numerically dominant taxa at Station IV-5, by sampling period (1% cutoff).

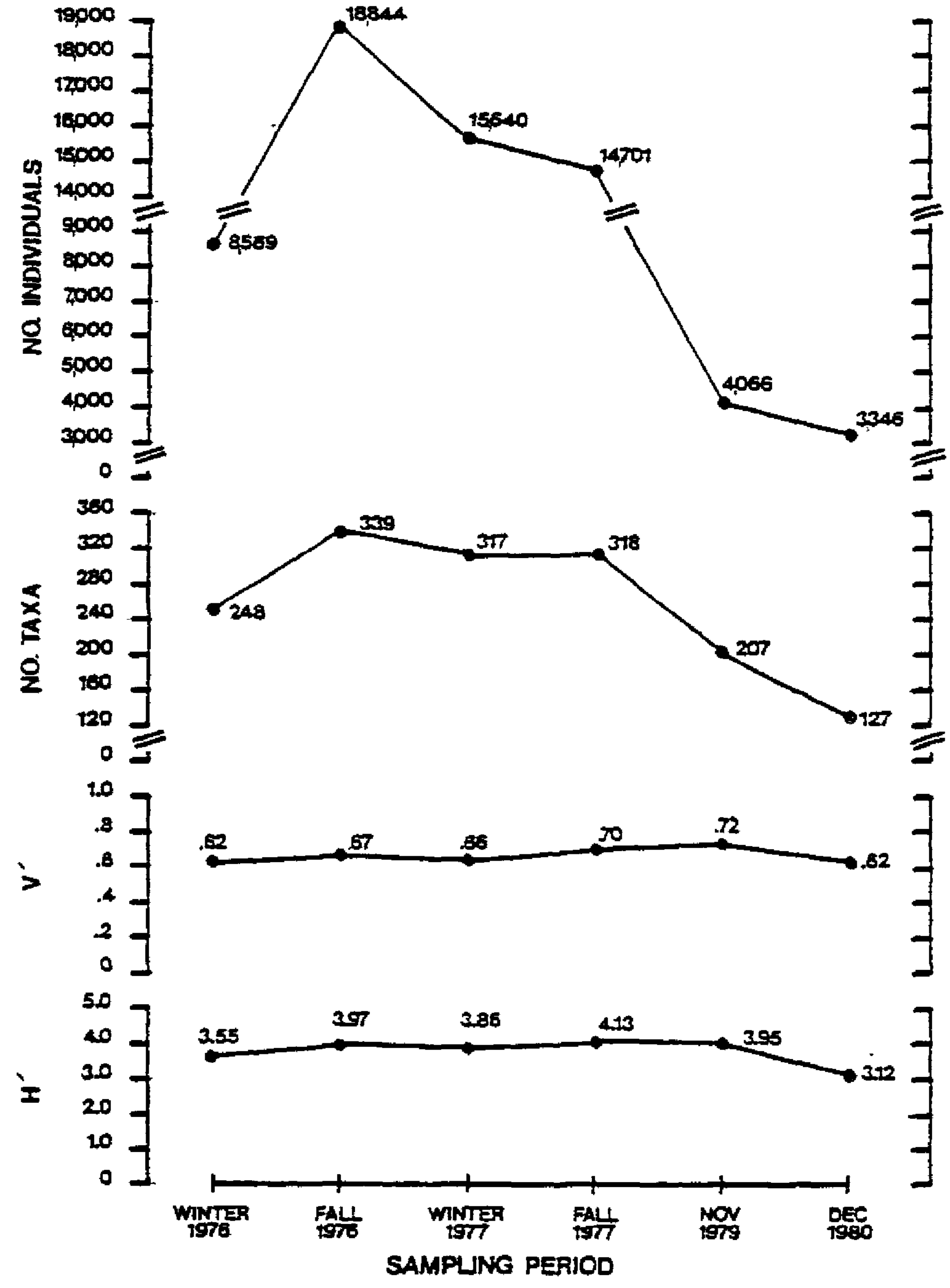

Figure 4-35. Community summary statistics (V', H', number of taxa, number of individuals) for all stations together, by sampling period.

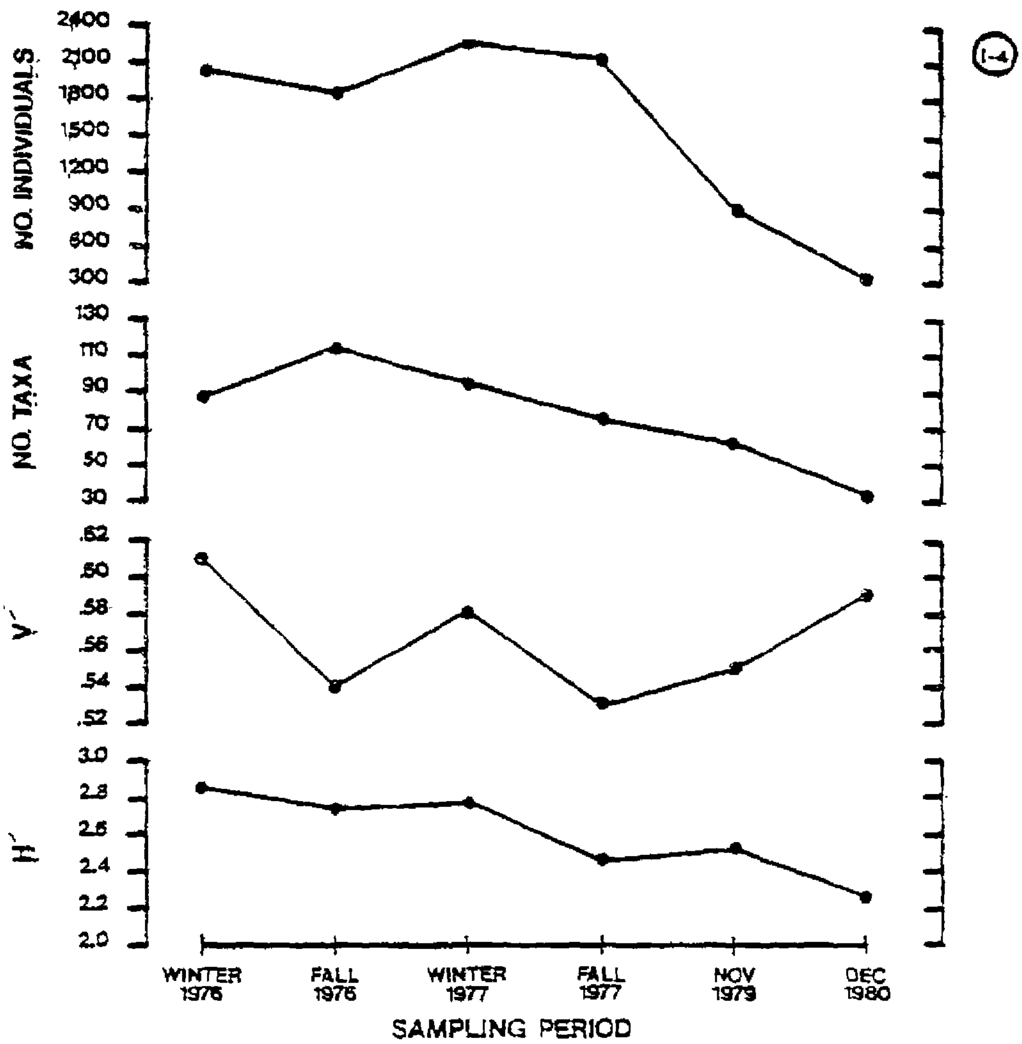

Figure 4-36. Community summary statistics at Station I-4, by sampling period.

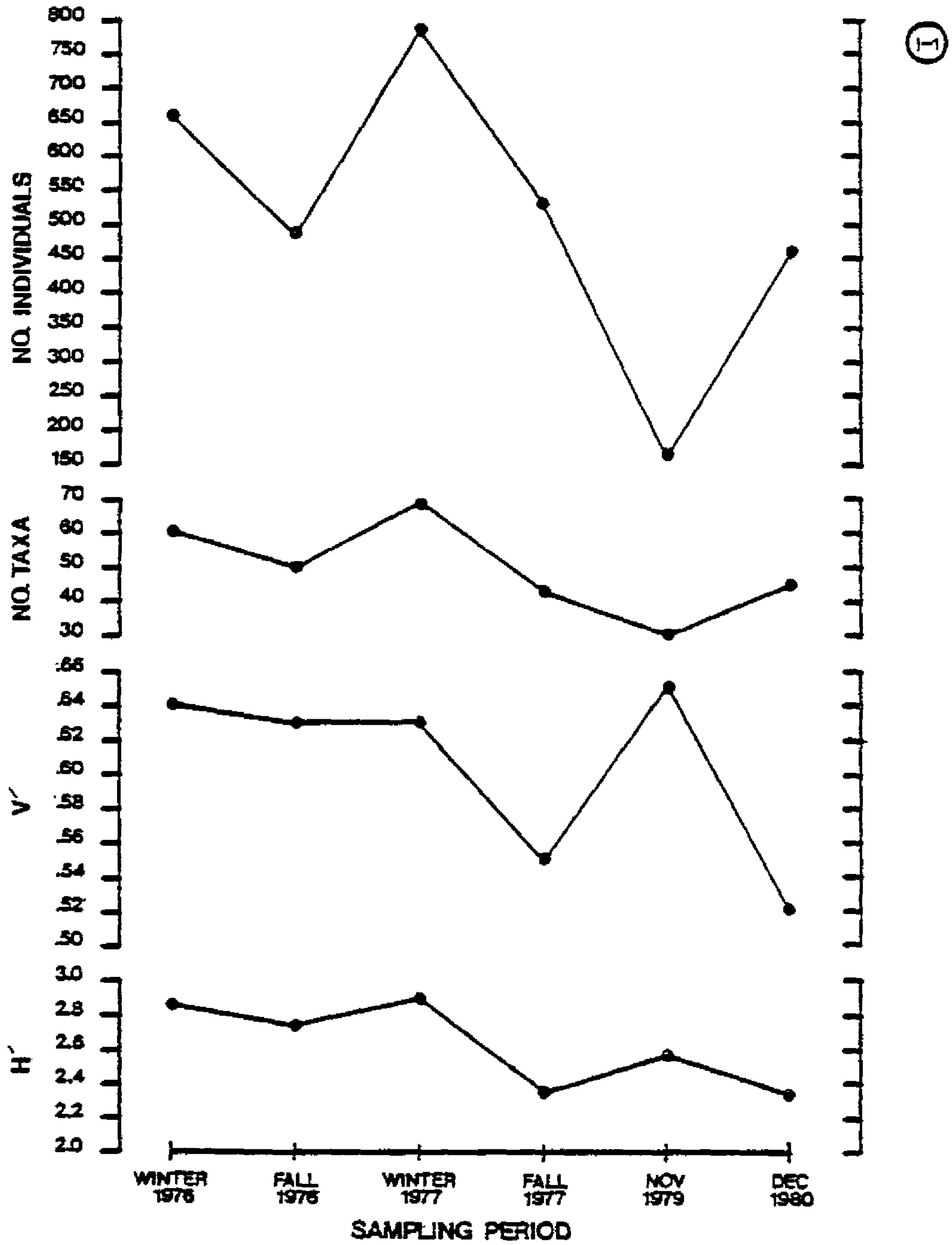

Figure 4-37. Community summary statistics at Station I-1, by sampling period.

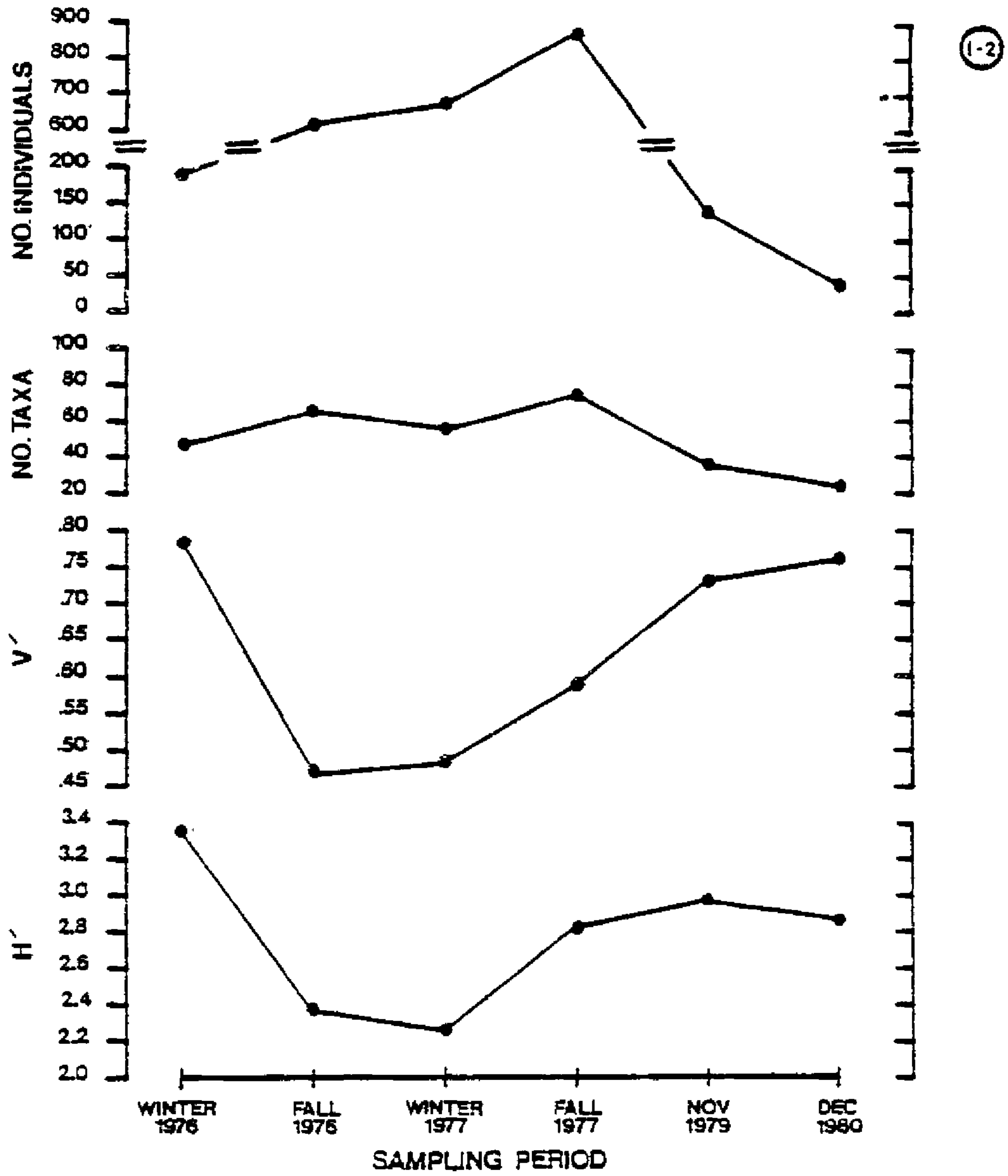

Figure 4-38. Community summary statistics at Station I-2, by sampling period.

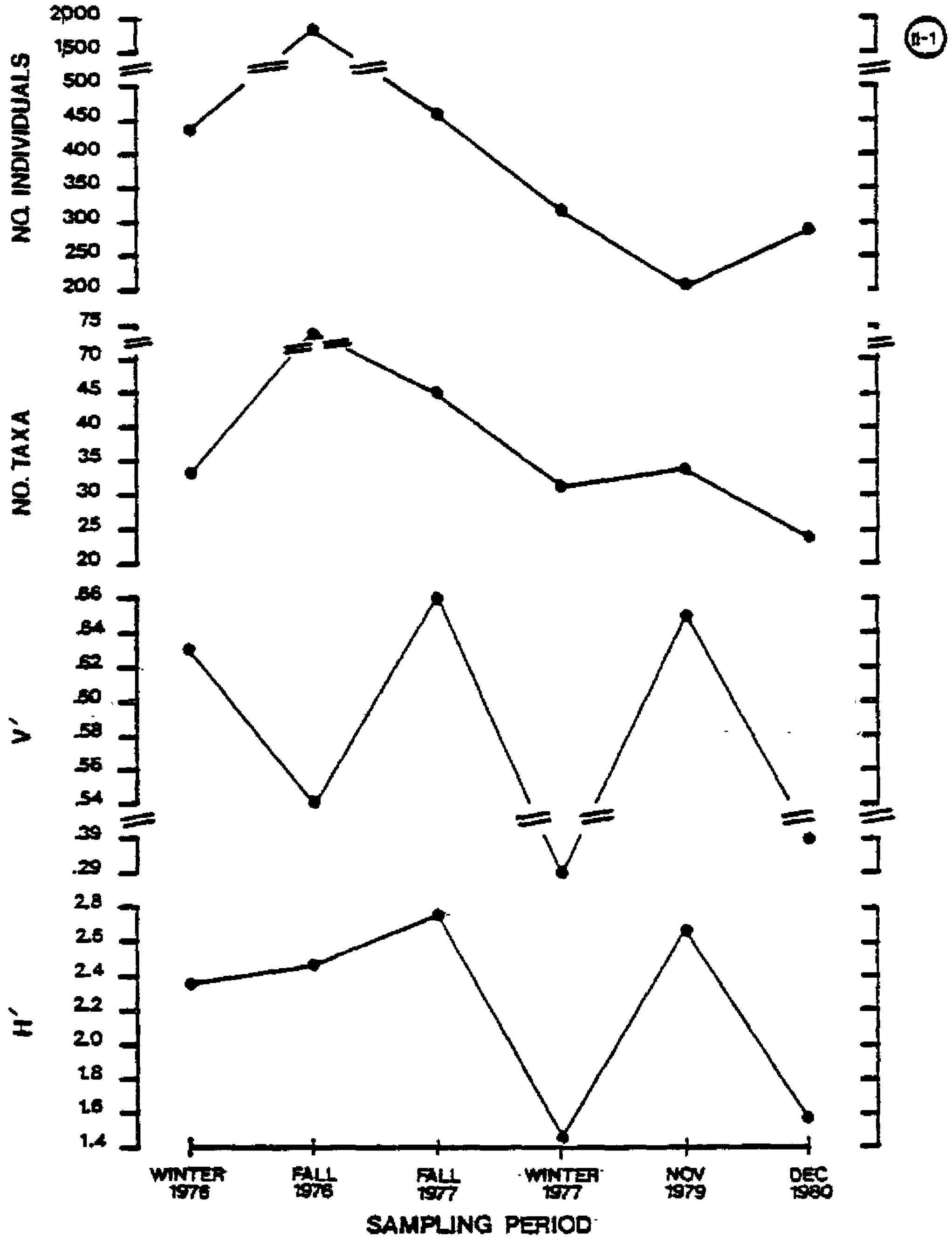

Figure 4-39. Community summary statistics at Station II-1, by sampling period.

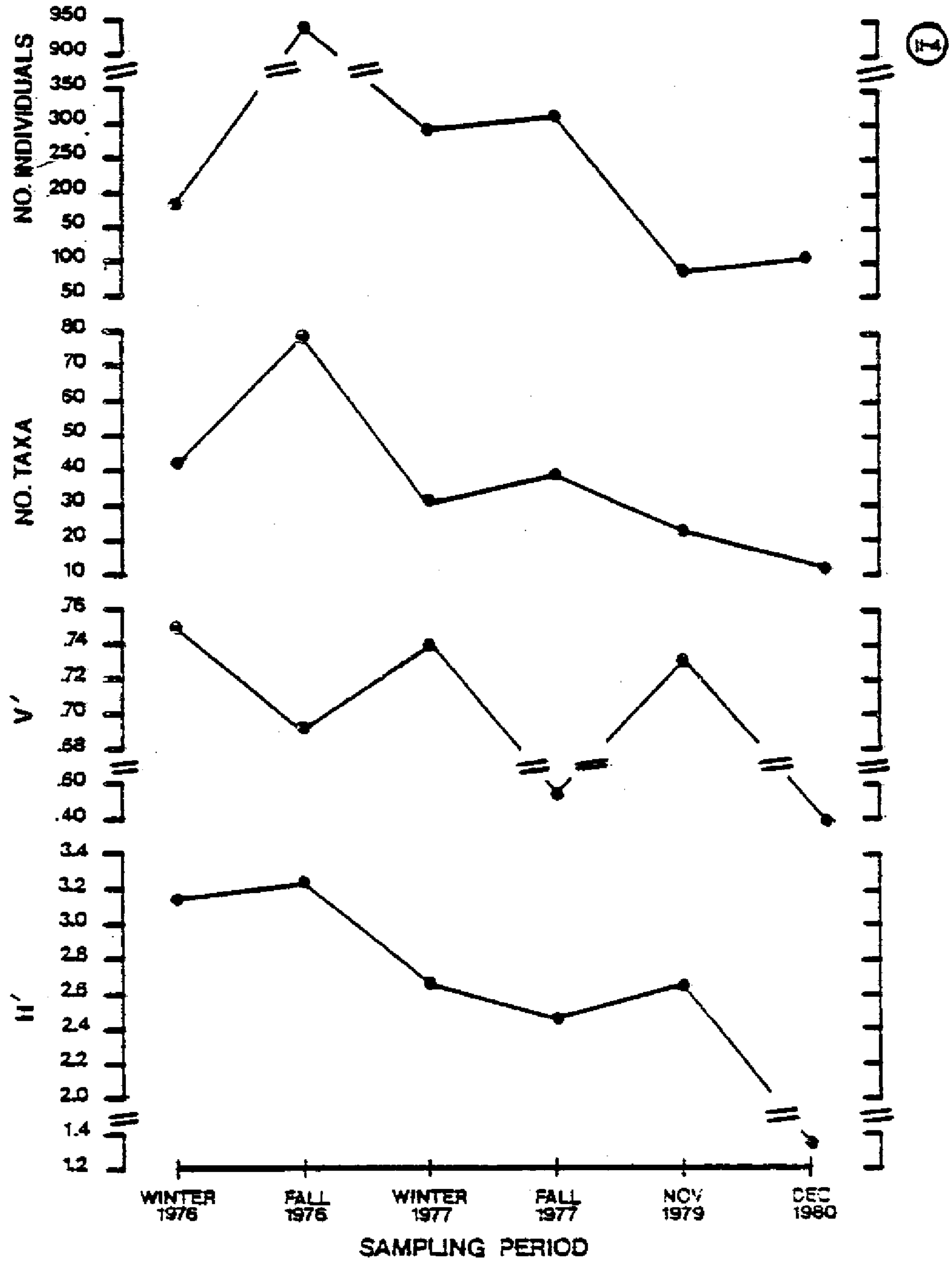

Figure 4-40. Community summary statistics at Station II-4, by sampling period.

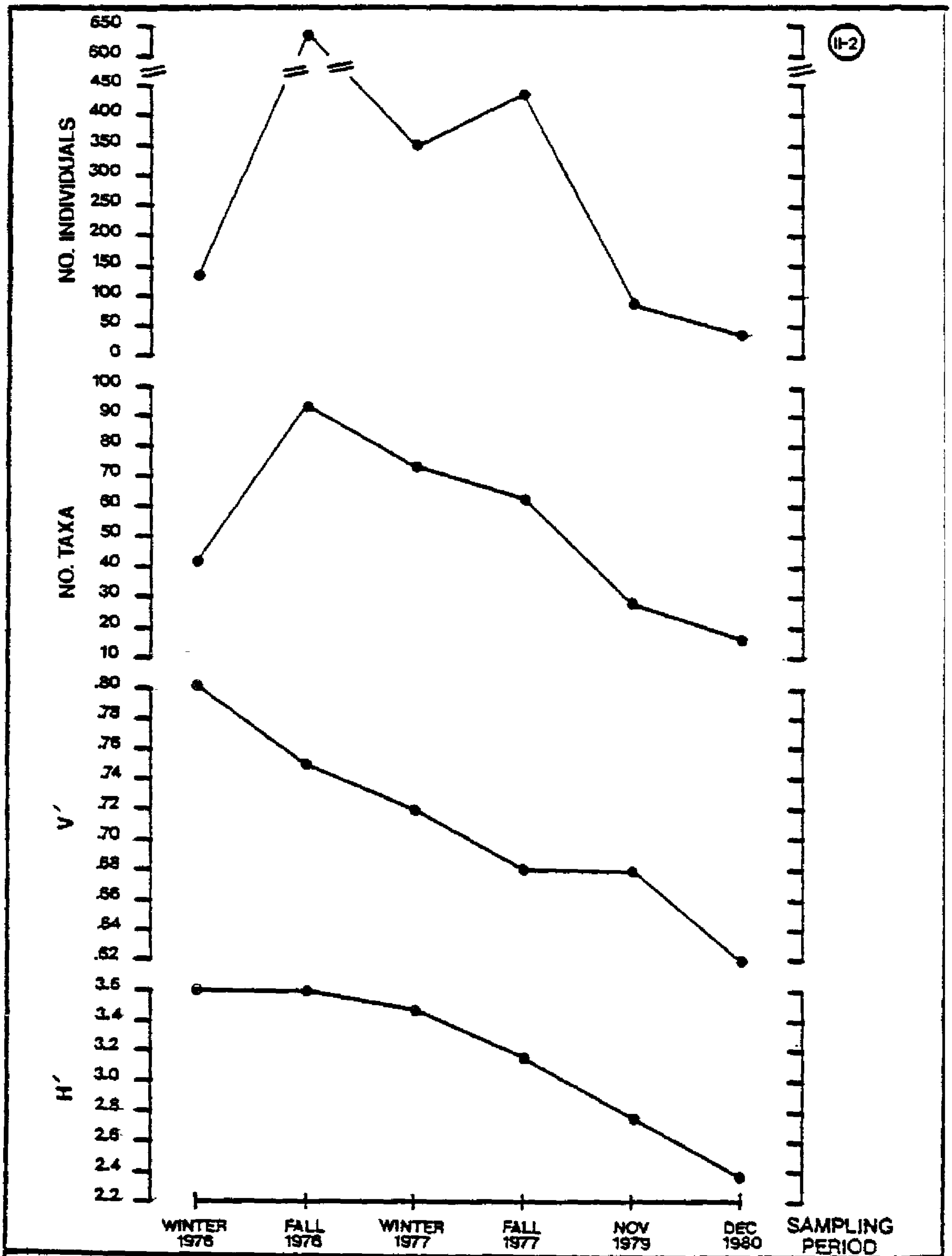

Figure 4-41. Community summary statistics at Station II-2, by sampling period.

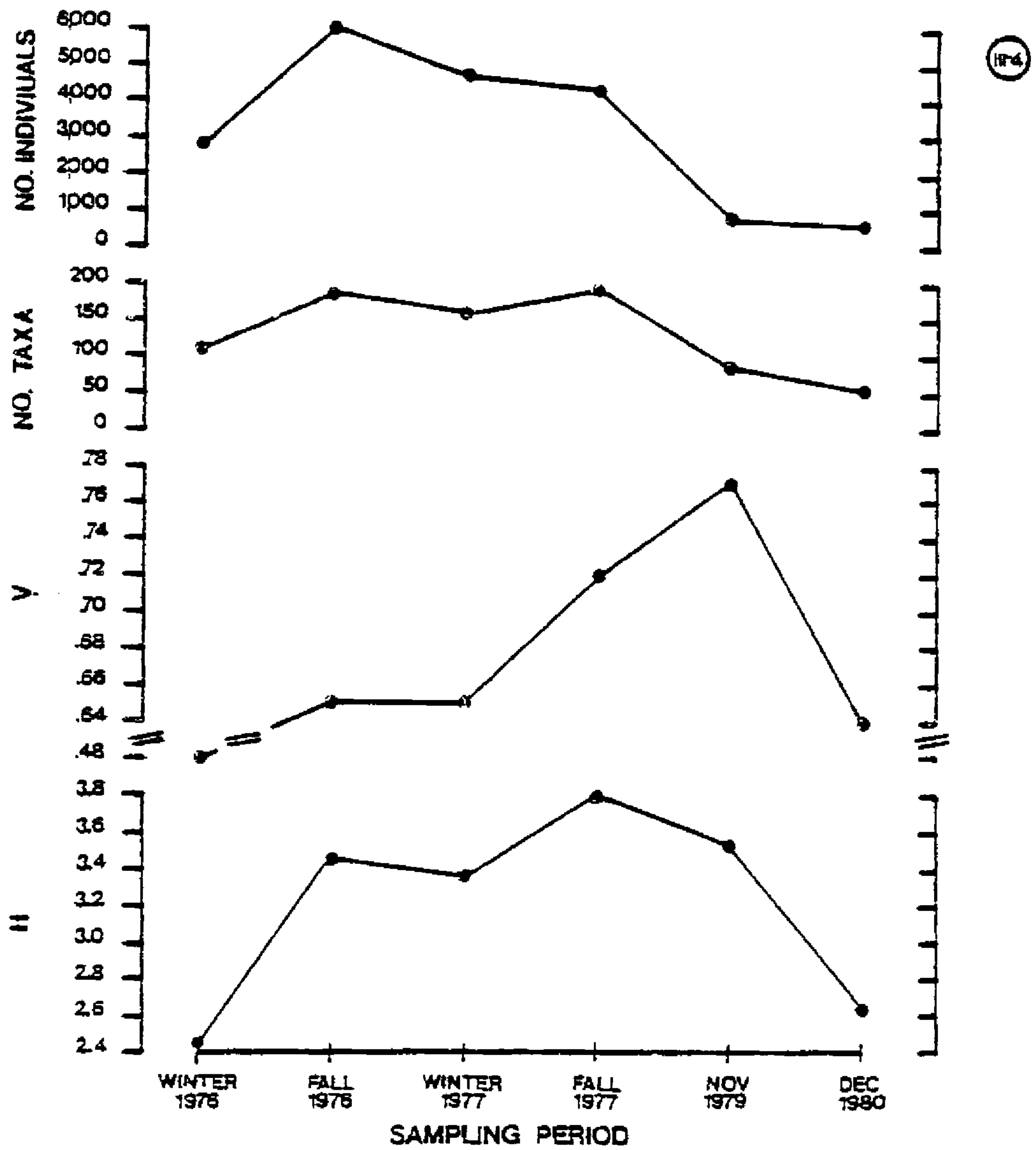

Figure 4-42. Community summary statistics at Station III-4, by sampling period.

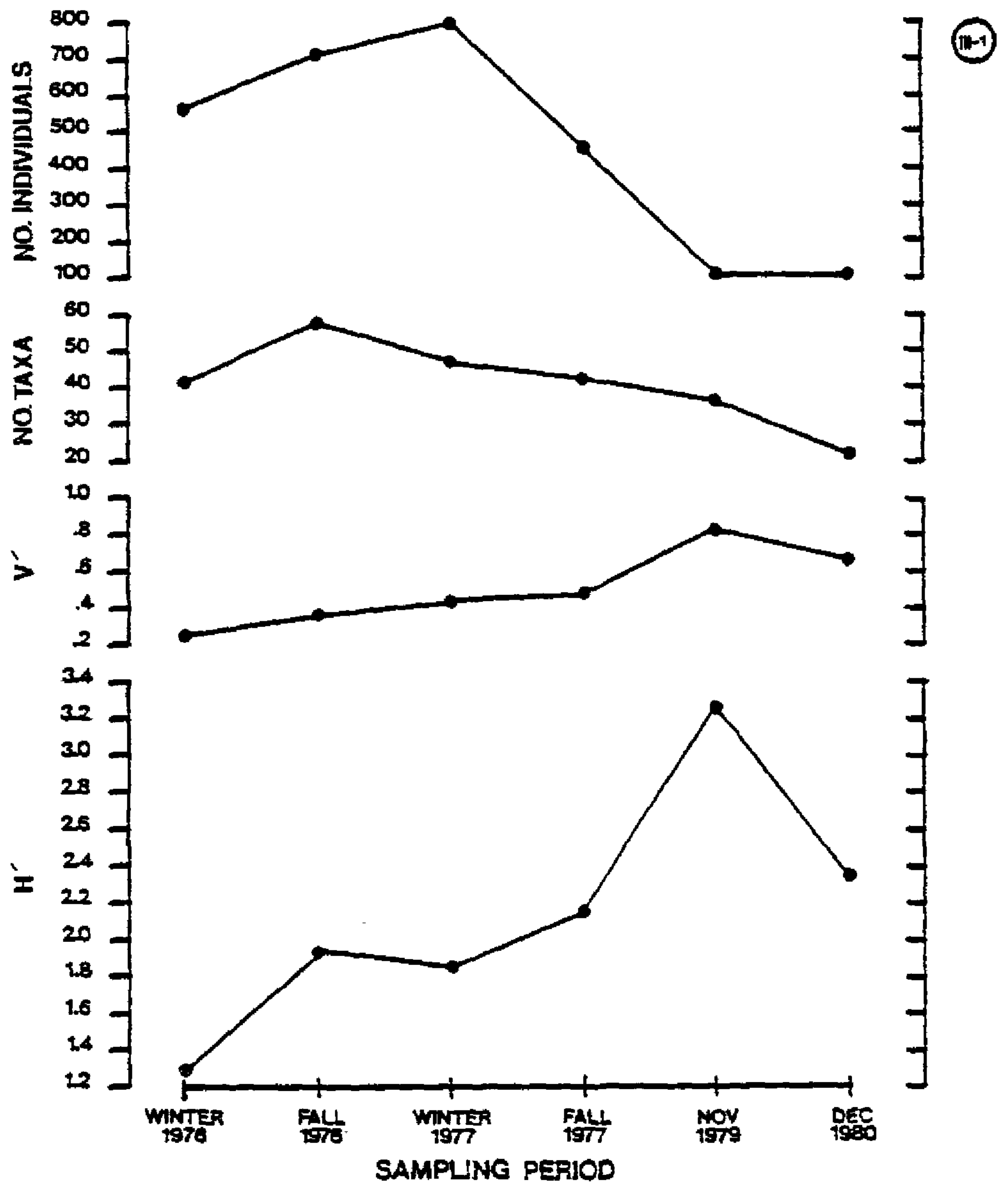

Figure 4-43. Community summary statistics at Station III-1, by sampling period.

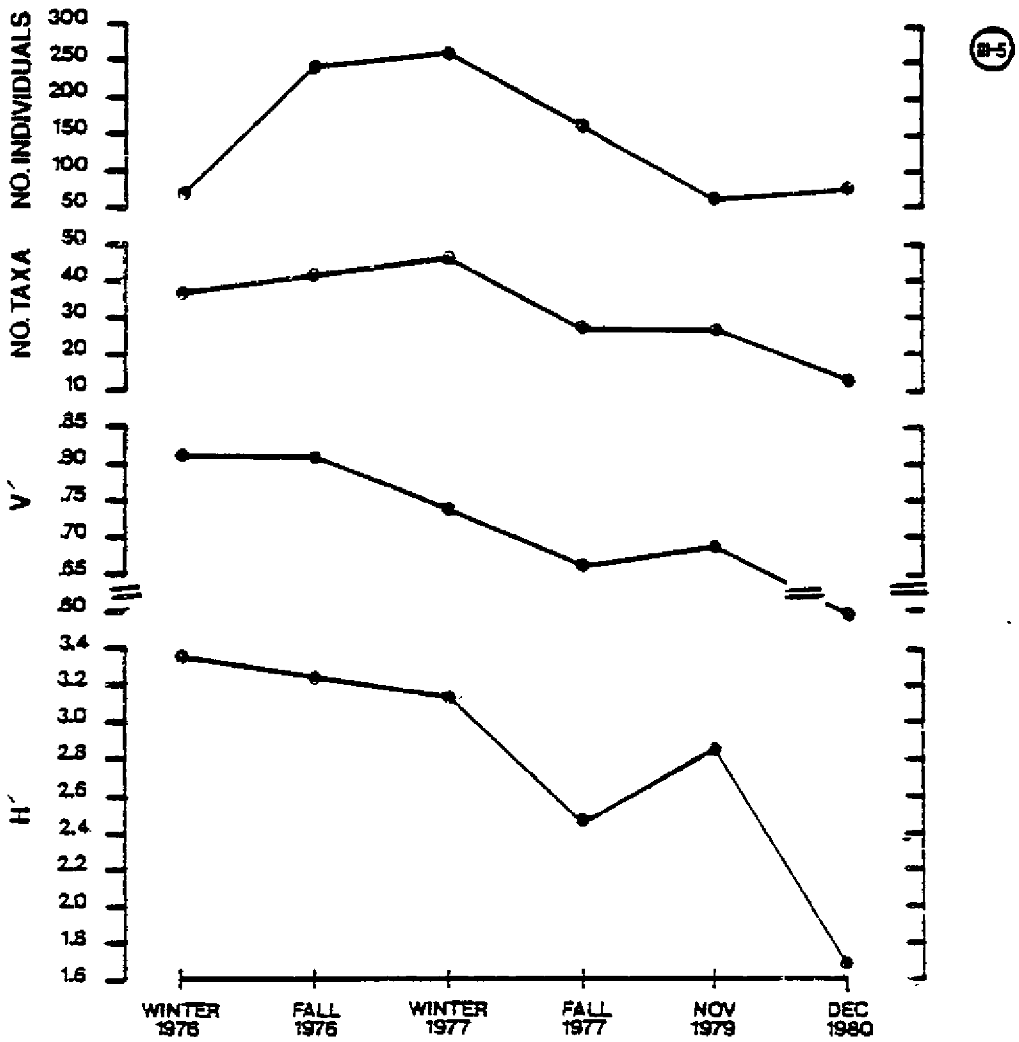

Figure 4-44. Community summary statistics at Station III-5, by sampling period.

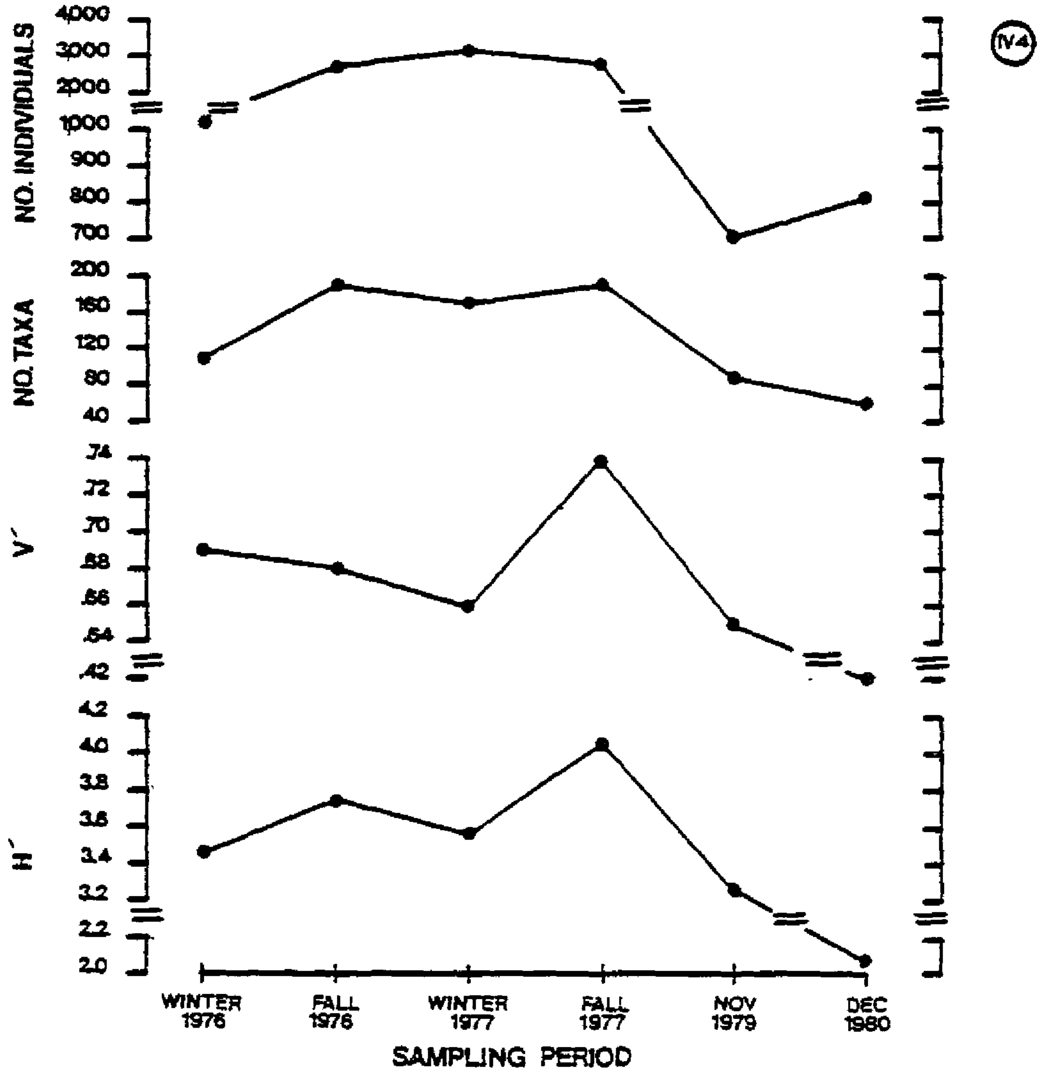

Figure 4-45. Community summary statistics at Station IV-4, by sampling period.

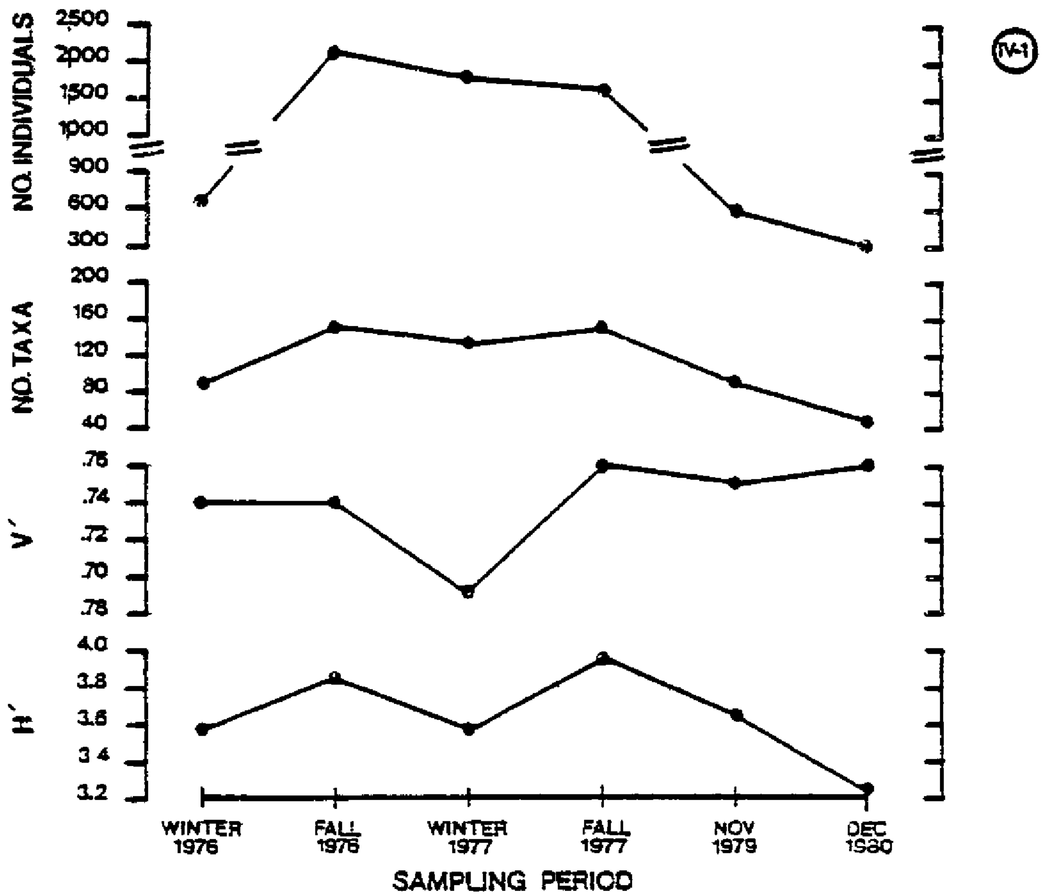

Figure 4-46. Community summary statistics at Station IV-1, by sampling period.

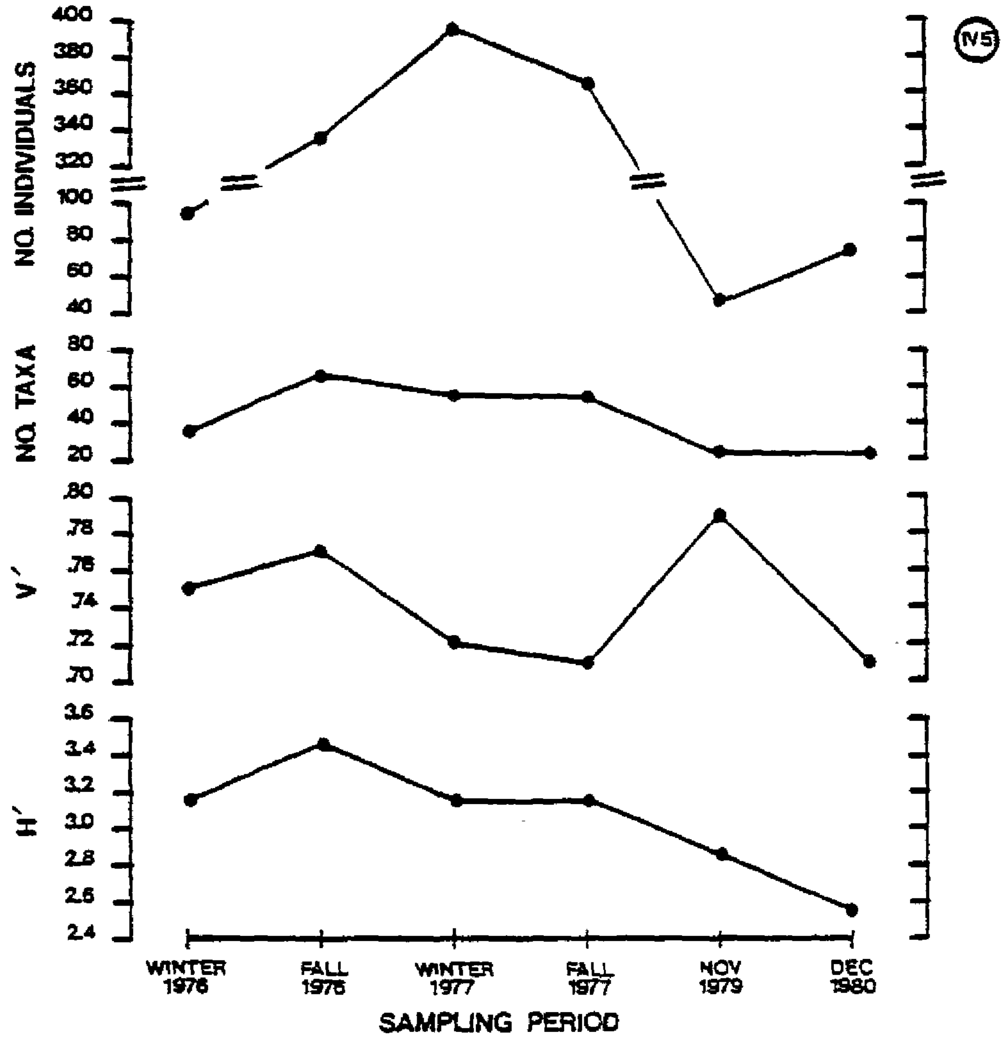

Figure 4-47. Community summary statistics at Station IV-5, by sampling period.

Table 4-4. Number of individuals, number of taxa, evenness (V') and diversity (H') at each station, by sampling period.

Number of Individuals

Station	Winter 76	Fall 77	Winter 77	Fall 77	Nov 79	Dec 80
I-4	2037	1865	2283	2143	900	396
I-1	668	491	789	526	164	458
I-2	197	606	668	860	135	47
II-1	442	1861	454	323	206	282
II-4	176	940	297	318	88	101
II-2	139	645	350	434	89	38
III-4	2095	6023	4635	4475	944	660
III-1	557	707	821	454	106	103
III-5	70	247	266	158	67	74
IV-4	1439	2875	3084	2947	702	818
IV-1	652	2249	1596	1695	617	293
IV-5	97	335	397	368	48	76

Number of Taxa

Station	Winter 76	Fall 77	Winter 77	Fall 77	Nov 79	Dec 80
I-4	88	112	94	75	62	33
I-1	60	50	69	43	30	45
I-2	49	66	57	75	35	23
II-1	33	74	45	32	34	24
II-4	41	79	30	39	23	12
II-2	43	94	74	64	28	16
III-4	102	179	159	195	82	54
III-1	41	58	47	43	37	21
III-5	36	42	46	26	27	13
IV-4	110	191	174	194	92	61
IV-1	89	151	131	146	91	49
IV-5	36	64	54	55	21	21

Evenness (V')

Station	Winter 76	Fall 77	Winter 77	Fall 77	Nov 79	Dec 80
I-4	.61	.54	.58	.53	.55	.59
I-1	.64	.63	.63	.55	.65	.52
I-2	.78	.47	.48	.59	.73	.76
II-1	.63	.54	.67	.29	.65	.40
II-4	.75	.69	.74	.57	.73	.39
II-2	.81	.75	.72	.68	.68	.62
III-4	.48	.65	.65	.72	.77	.60
III-1	.24	.38	.42	.48	.82	.64
III-5	.81	.81	.74	.66	.70	.49
IV-4	.69	.68	.66	.74	.65	.42
IV-1	.74	.74	.69	.76	.75	.76
IV-5	.74	.77	.72	.71	.80	.71

Table 4-4 (cont'd)

Diversity (H')

I-4	2.87	2.77	2.79	2.44	2.52	2.28
I-1	2.86	2.73	2.90	2.32	2.59	2.31
I-2	3.37	2.38	2.26	2.82	3.00	2.89
II-1	2.39	2.49	2.77	1.46	2.64	1.59
II-4	3.13	3.22	2.67	2.44	2.66	1.33
II-2	3.38	3.66	3.49	3.15	2.79	2.38
III-4	2.42	3.49	3.39	3.89	3.53	2.62
III-1	1.29	1.92	1.86	2.15	3.29	2.33
III-5	3.37	3.24	3.12	2.47	2.88	1.68
IV-4	3.43	3.75	3.57	4.03	3.26	2.05
IV-1	3.59	3.84	3.58	3.97	3.65	3.21
IV-5	3.17	3.48	3.13	3.14	2.82	2.56

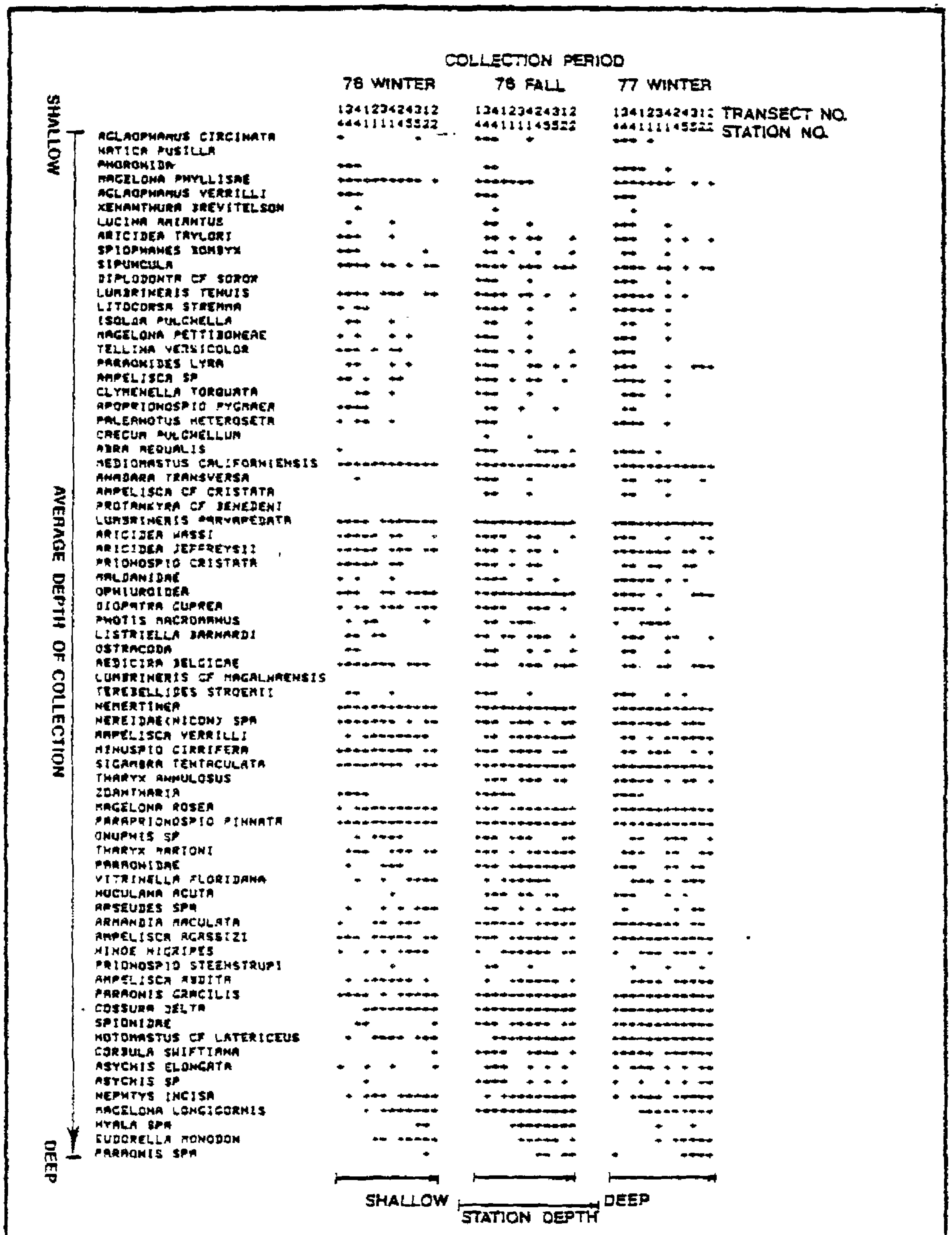

Figure 4-48. Presence (+) of numerically dominant taxa (listed top to bottom in order of increasing collection depth) during six collection periods (in chronological order left to right) at twelve stations (listed left to right by increasing depth, within each collection period) (0.1%) cutoff) (see text for explanation).

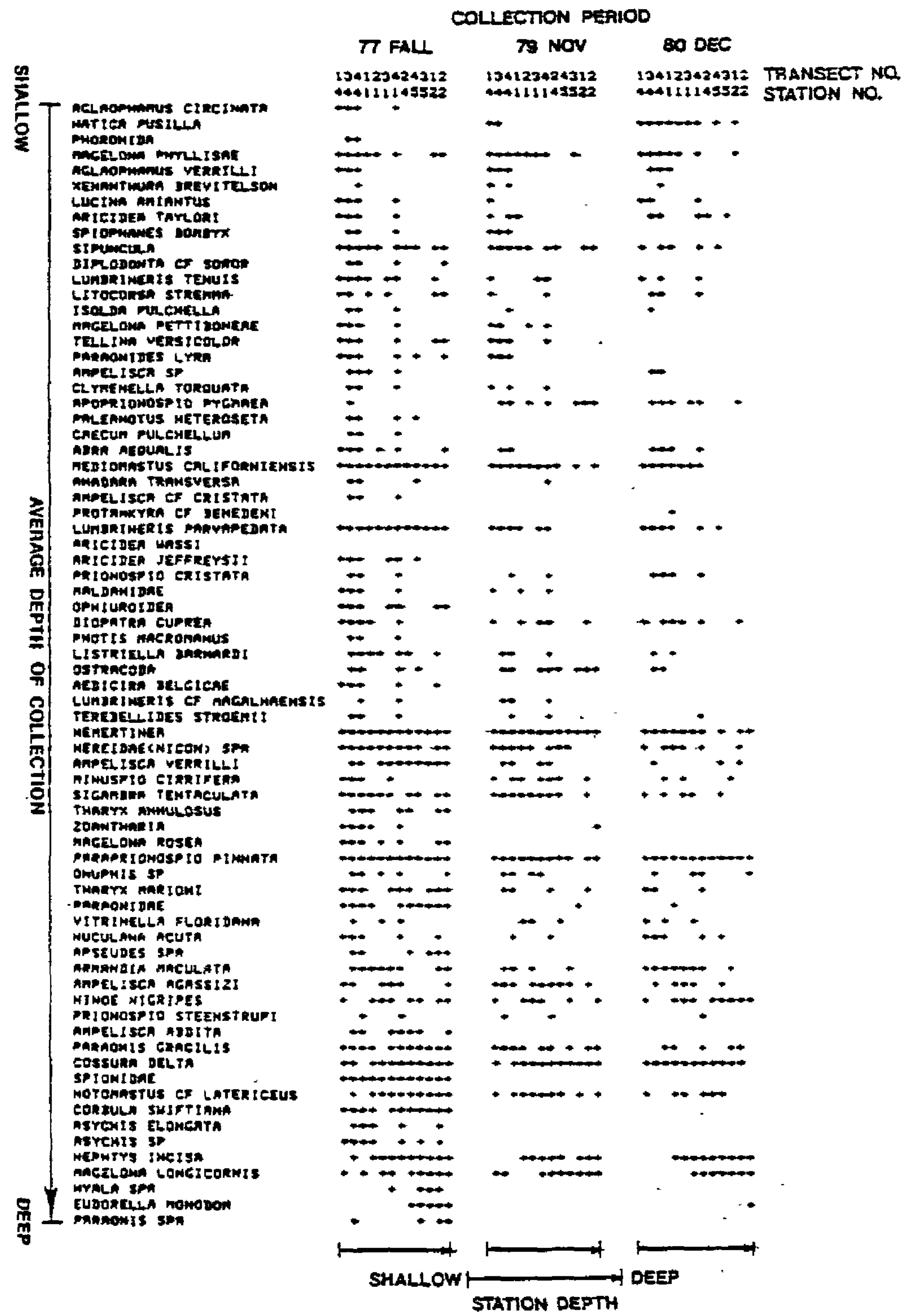

Figure 4-48 (cont'd).

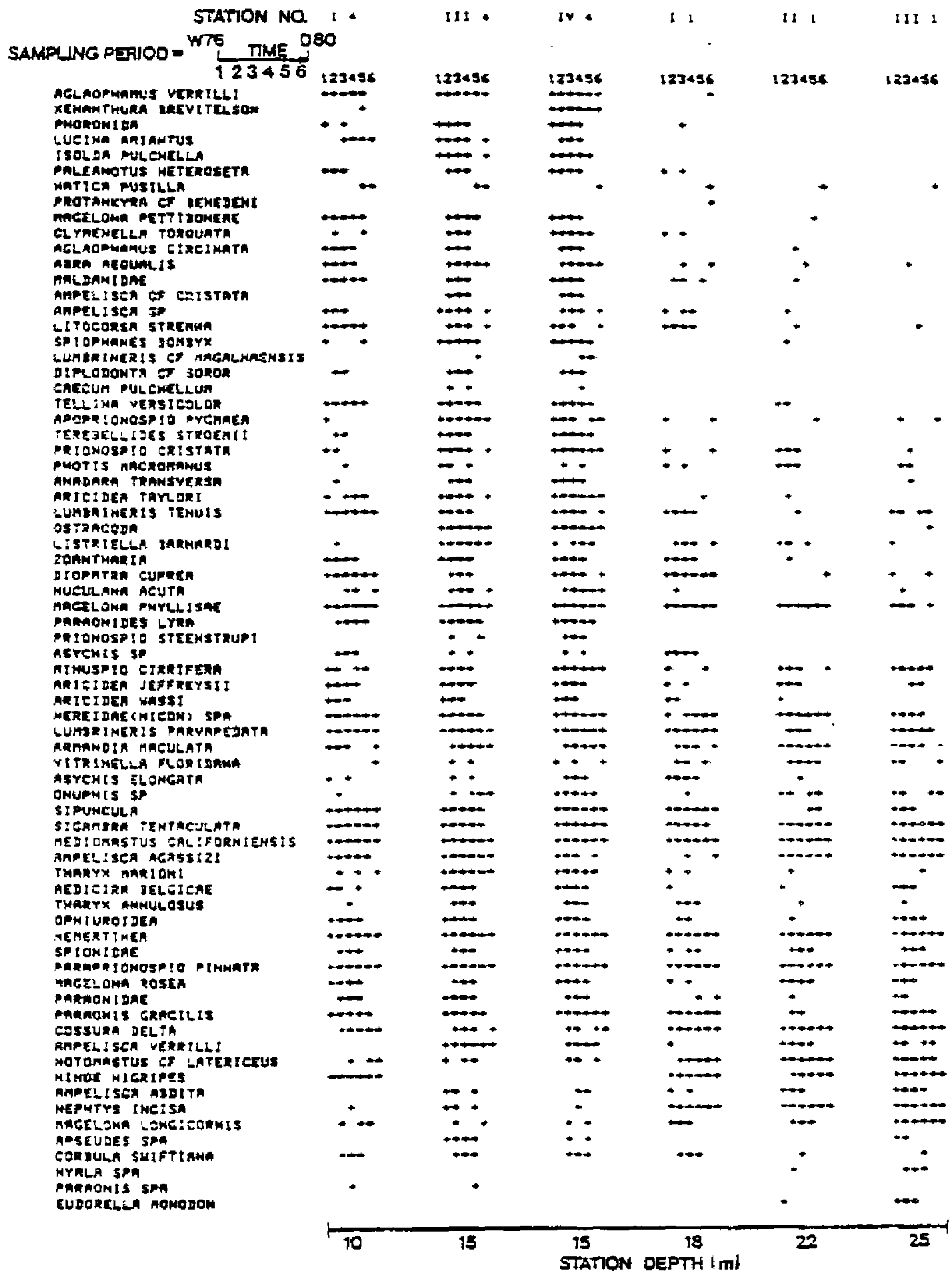

Figure 4-49. Presence (+) of numerically dominant taxa (listed top to bottom in order of increasing collection depth) at each of twelve stations (listed left to right by increasing depth) during six collection periods (listed one-six in chronological order for each station) (0.2% cutoff) (see text for explanation).

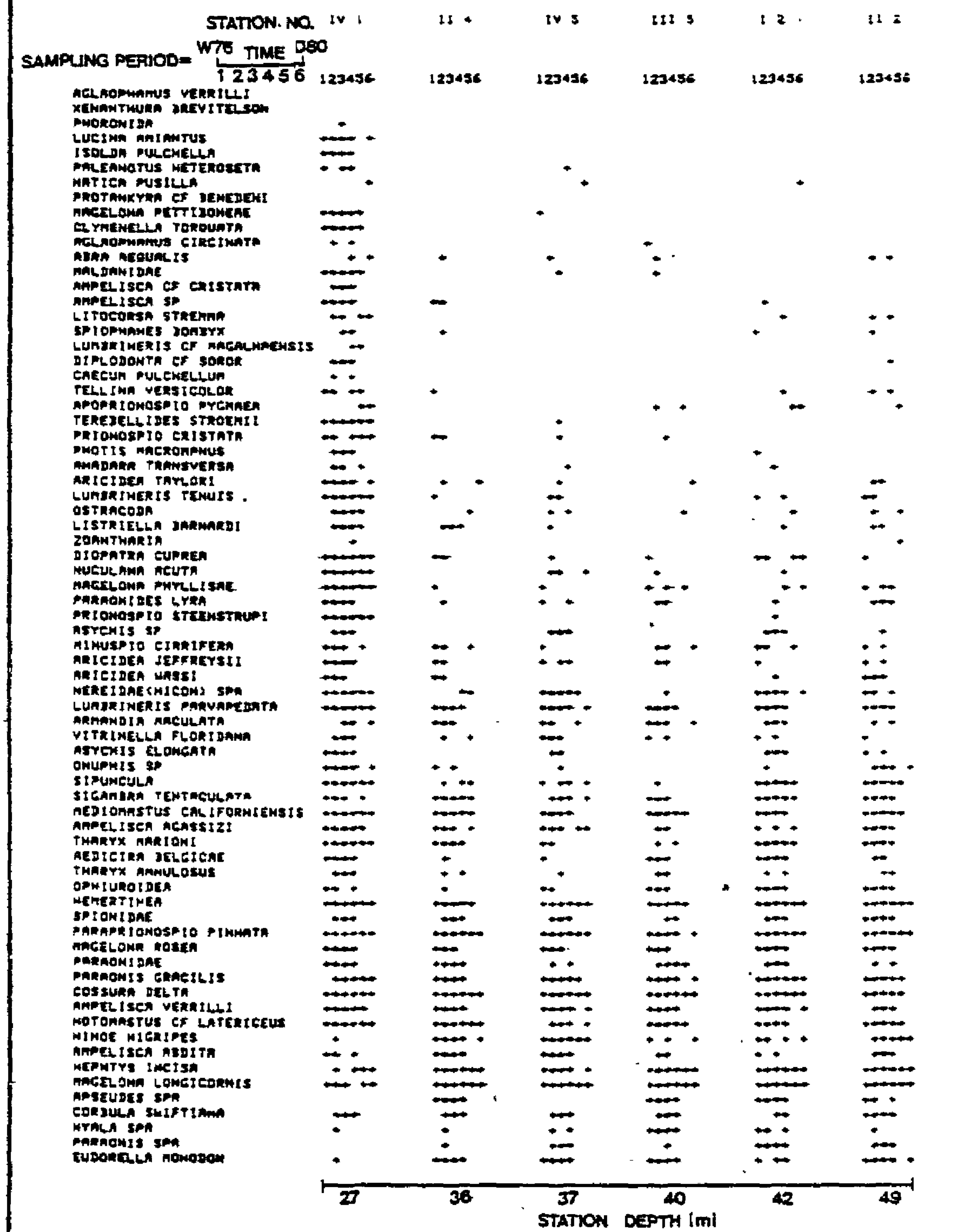

Figure 4-49 (cont'd).

During fall 1976, the sampling period when total abundance and number of taxa observed were highest, most taxa which were present spanned the entire depth range (10-49 m) (Figure 4-48). For example, 40 out of 69 numerically dominant taxa (58%) were present at either or both of the two shallowest stations as well as at either or both of the two deepest stations in fall 1976 (i.e., ≤15 m, ≥42 m). A relatively large suite of taxa was restricted to the 3 shallowest stations, with an apparent break point between Stations III-4 and IV-4 (depth 15 m) and Station I-1 (depth 18 m) (Figures 4-48 and 4-49). However, one of the deeper stations (IV-1, depth 27 m) showed a very similar pattern to the three shallowest stations. Taken as a group, 15 taxa (22% of 69) were found at these four stations and no others during this sampling period. All four stations were characterized by fairly coarse, sandy sediment. At the other end of the scale, three taxa found primarily at the deeper stations (the gastropod Hyala sp. A, the paraonid polychaete Paraonis sp. A, and the cumacean Eudorella monodon) were rare or absent from the shallowest stations.

In winter 1977, the sampling period when total abundance and number of taxa observed were second highest, a similar picture was seen. Thirty-three out of 68 numerically dominant taxa present (49%) spanned the depth range from either or both of the two shallowest stations to either or both of the two deepest stations. Eleven of the 68 numerically dominant taxa (16%) were restricted to the group of four sandy-sediment stations mentioned above (depth 27 m or less). One of the taxa present only at the deepest stations in fall 1976 (Paraonis sp. A) was found at the shallowest station (I-4) in winter 1977.

During fall 1977, when total abundance and number of taxa observed were third highest, several changes were evident in Figure 4-48. Thirty-eight out of 69 numerically abundant taxa (55%) were present over the broad depth range from ≤15 m to ≥42 m. However, a number of taxa that were formerly present at all stations (nine in fall 1976, eleven in winter 1977) were reduced in distribution (five in fall 1977) or even completely absent (the paraonid polychaete Aricidea wassi). In the case of these taxa which were relatively non-depth-specific, stations at middle depths were as likely to be deleted from the distribution as those at either end of the depth range. Nineteen out of 69 numerically abundant taxa (28%) were restricted to the four sandy stations mentioned above. Only two taxa (Hyala sp. A and Eudorella monodon) were still absent from the shallowest stations.

During winter 1976, total abundance and number of taxa observed were third lowest. Perhaps the most obvious difference was that a number of taxa which (on the basis of the data from fall 1976 and winter 1977) have potentially wider habitat preferences were restricted in their distribution. Twenty-five out of 65 numerically dominant taxa (38%) spanned the depth range from ≤15 m to ≥42 m. Only three taxa were present at all twelve stations, the third lowest value recorded. Twelve out of 65 numerically dominant taxa (18%) were present only at the four sandy stations. Three taxa (the pelecypod Corbula swiftiana, Hyala sp. A, and Paraonis sp. A) were found only at the three deepest stations.

The samples from 1979 and 1980 appear in Figure 4-48 to be markedly different from those taken in all previous sampling periods. The numbers of numerically dominant taxa dropped to 47 and 41, respectively. Losses were present in shallow, deep, and non-depth-specific taxa. Seventeen out of 47 taxa (36%) spanned the depth range from ≤15 m to ≥42 m in 1979, and eleven out of 41 taxa (27%) in 1980. However, in both years, only a single taxon was present at all 12 stations (Nemertinea in 1979, *Paraprionospio pinnata* in 1980). Seventeen out of 47 taxa (36%) were restricted to the set of four sandy stations in 1979; in 1980, ten out of 41 taxa (24%) were similarly limited in distribution.

Conspicuous absences from the 1979 and/or 1980 samples included the polychaetes *Paleanotus heteroseta* (Palmyridae), *Aricidea jeffreysii*, *Aricidea wassi*, *Paraonides lyra*, *Paraonis* sp. A and *Aedicira belgicae* (Paraonidae), *Tharyx annulosus* (Cirratulidae), *Magelona rosea* (Magelonidae), *Aglaophamus circinata* (Nephthyidae), *Asychis* sp., *Asychis elongata* (Maldanidae); the gastropods *Hyala* sp. A and *Caecum pulchellum*; the pelecypods *Anadara transversa*, *Corbula swiftiana*, *Diplodonta* cf. *soror* and *Tellina versicolor*; the corophiid amphipod *Photis macromanus*; the ampeliscid amphipods *Ampelisca abdita*, *Ampelisca* cf. *cristata* and *Ampelisca* sp.; the tanaid *Apseudes* sp. A; the cumacean *Eudorella monodon*; and miscellaneous unidentified spionid polychaetes, ophiuroids, phoronids, and zoantharians.

Figure 4-49 graphically illustrates a decrease in the number of taxa with increasing depth. Many taxa present in shallow water were very scarce or absent at stations deeper than 15 m deep. The notable exception to this generalization is the fauna of Station IV-1 (27 m), which has a set of shallow-water taxa similar to that at the three shallowest stations, as mentioned above. The inverse is not true; only three taxa (*Hyala* sp. A, *Paraonis* sp. A, and *Eudorella monodon*) were rarely found at the shallowest stations. Other than these, no clearly defined set of taxa was associated with the deeper stations. The great majority of taxa common at the deepest stations were also as likely to be present at the shallowest stations.

Figures 4-50 and 4-51 summarize the cumulative numbers (4-50) and relative proportions (4-51) of taxa which occurred at a given number of stations within each sampling period. The percentages given in Figure 4-51 accumulate horizontally to 100%, and are thus independent of the total numbers of taxa present within any given sampling period. The data show that in fall 1976, a higher proportion of taxa (68%) appeared at more than one station than in any other sampling period, followed by fall 1977 (66%), winter 1977 (60%), 1979 (58%), and winter 1976 and 1980 (both 57%). Periodic trends are not obvious in the data for multiple occurrences at fewer than three or four stations, indicating that most taxa found in any sampling period were present at at least a few sites. Despite this similarity between sampling periods for low levels of multiple occurrences, the highest percentage of multiple occurrences at nearly every level from two or more stations through twelve was seen in fall 1976; in other words, a greater proportion of taxa appeared at more stations during fall 1976 than during any other sampling period.

At higher levels of multiple occurrences, differences between sampling periods were more evident, based upon the median value for multiple occurrences (i.e., the percentage of taxa which were present at seven or

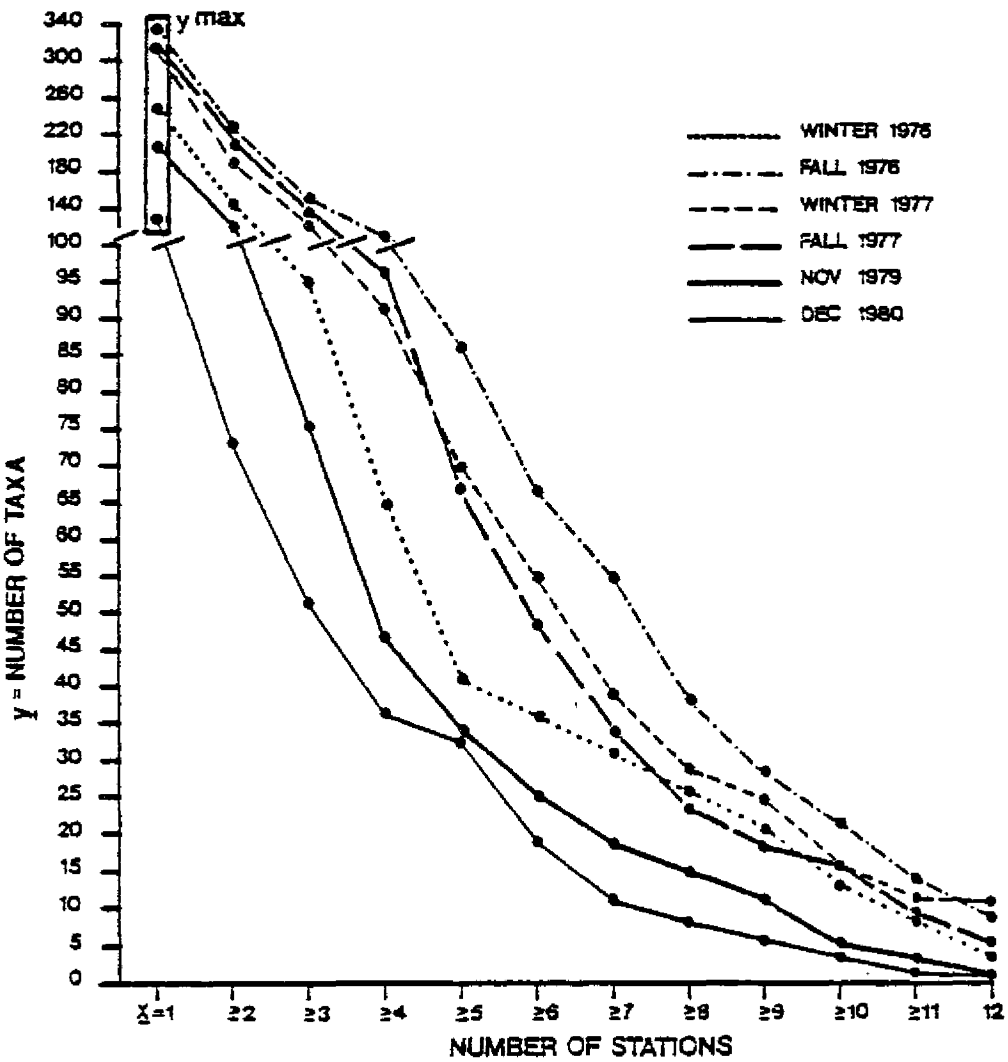

Figure 4-50. Numbers of taxa (y) at a given number of stations (x), by sampling period (y max = total number of taxa per sampling period).

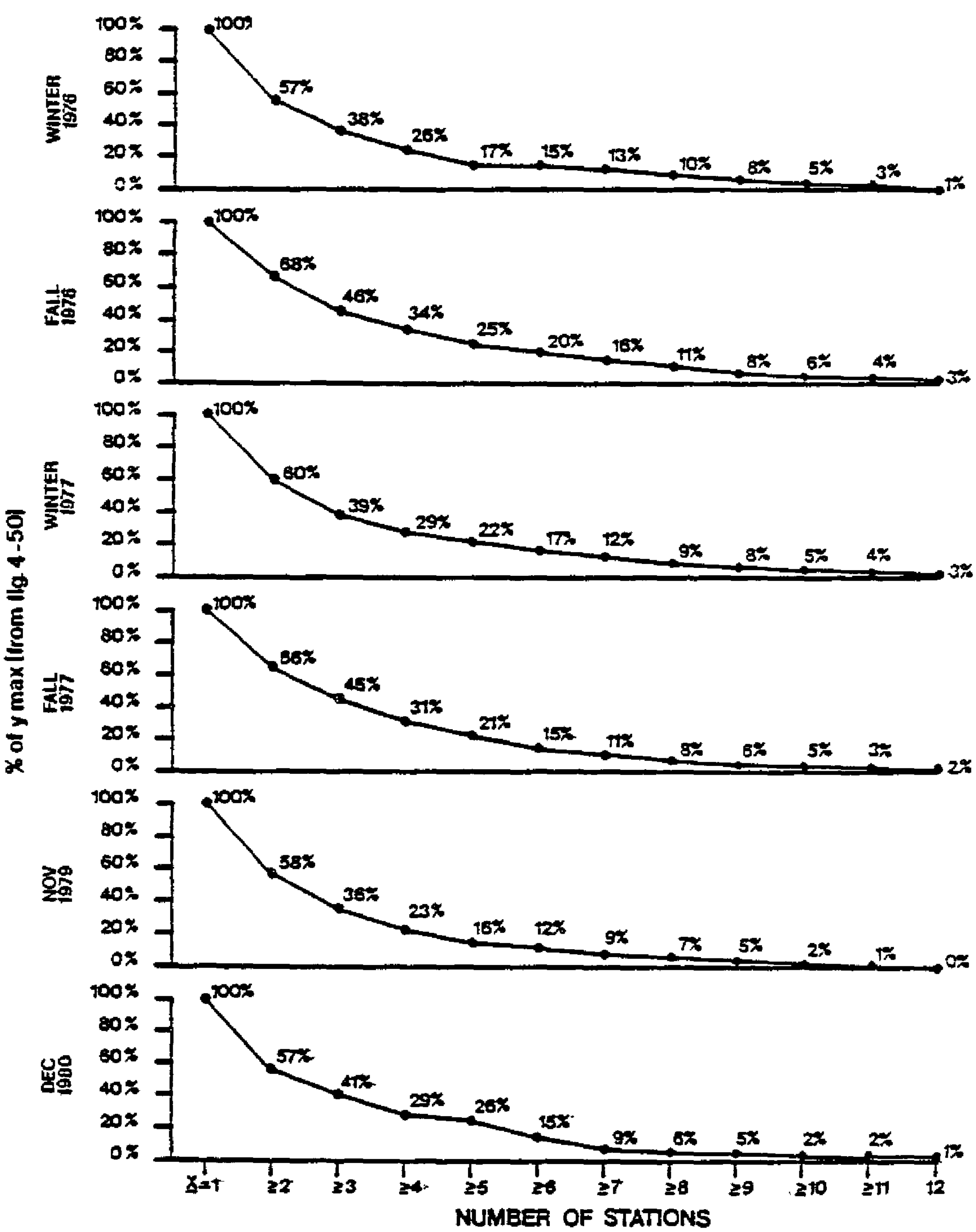

Figure 4-51. Relative proportions of numbers of taxa (% of y max from Figure 4-50) at a given number of stations, by sampling period.

more stations). In winter 1976, the median value was 13%. In fall 1976, the median value rose to 16%. From winter 1977 onward, the median value for multiple occurrences dropped steadily from 12% to 11% a low of 9%, indicating a progressively narrower range of habitat availability for taxa which previously had been very widely distributed.

Relatively clear patterns of association between stations were produced for each sampling period by cluster analysis based upon abundance of numerically dominant taxa and then inverted to group stations (Figures 4-52 through 4-58). Stations were generally clustered into three major groups by use of a distance measure of 0.80 as a defining limit: three nearshore and one deeper station (I-4, III-4, IV-4, and IV-1); five offshore stations (I-2, II-4, II-2, III-5, and IV-5), and three lying at some intermediate distance (I-1, II-1, and III-1). At a higher level (distance measure 0.85–0.91), stations were grouped into two clusters, a nearshore assemblage usually including just the inshore group previously delimited by the 0.80 distance measure, and an offshore assemblage usually including the members of the offshore and intermediate groups that had been separated by the 0.80 distance measure. Unless otherwise mentioned, all text references to groupings in cluster analyses by individual sampling periods are based upon use of the 0.80 distance measure.

When samples from fall 1976 were clustered with those from winter 1977 (the two samples taken closest together in time), in eight out of twelve stations the most closely associated groupings were the paired fall and winter samples from the same station (Figure 4-55) although four stations did not show this tendency (indicated by stars on Figure 4-55). This observation is in accord with the results presented in the trellis diagram (Figure 4-8), which showed the strongest associations between these two sampling periods.

A two-way table for all stations and sampling periods was produced by merging the cluster analysis based upon abundance of numerically dominant taxa with an inverse dendrogram by station and time period, regarding each sampling period at each station as a separate entity. The 72 station-period x 72 taxa matrix itself is not reproduced in this report due to its size (reduction to the proper format made it wholly illegible) but the two cluster groupings (Station Groups and Animal Groups) resulting from the analysis are presented in Figure 4-59. A copy of the original matrix is available on request from the senior author (G.S. Lewbel).

At least four major groups of station/periods (numbered Station Groups 1-4) emerged, while the pattern by taxa was much more complicated and was divided into nine lettered Animal Groups (A-I). In interpreting the results, the reader should keep in mind that a Station Group may have included several stations sampled at the same or at different times, and/or the same station sampled at different times. The same stations did not always appear in the same cluster through time, indicating substantial heterogeneity in taxonomic composition within stations from one sampling period to the next. Individual Station Groups are broken out in more detail in Figures 4-60 through 4-63.

Station Group 1 included a set of stations ranging in depth from 25 m to 49 m (average depth 38 m), primarily having fairly fine silty-clay sediment (Figure 4-60). These six offshore stations were biologically