

~~Pandanus~~  
Hettner

PROGRESS REPORT  
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Microsporidan Infection in Pandalus jordani Caught in the  
Commercial Fishery off the Coasts of Washington and Oregon - 1975

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During 1975, a survey of microsporidan infections in pink shrimp, Pandalus jordani, caught in the commercial fishery off Oregon and Washington, was conducted. This survey was initiated after a report came to us from shrimp processors in Astoria (by way of Dr. David Crawford) that unusually high incidences of microsporidan infection in shrimp caught in the northern Washington-Vancouver Island area were causing reduced yield to the processor.

When the survey was begun, it was known that at least one species of microsporidan, Thelohania sp., could be found in these shrimp. The purpose of the survey was to determine the incidence of infection by area and by season. It was hoped that this would lead to a better understanding of the impact of this parasite on pink shrimp populations and on the fishery itself in terms of reduced yield.

It was soon found that more than one species of microsporidan was involved. In addition to Thelohania sp., undescribed species of Nosema and of Pleistophora were also found. Shrimp infected with these parasites are indistinguishable grossly, but the three species are easily separated

microscopically. All three spread throughout the musculature of the host and cause a white, opaque appearance. The musculature of infected shrimp undergoes lysis and when processed, no product results.

During 1975, a total of 18,757 shrimp were examined from all areas and 49 infected shrimp were found, an incidence of 0.26%. Although the incidence was exceedingly low, some interesting observations were made when the data was broken down by area and by season (Table 1).

Shrimp caught off Oregon (areas 82-88) had an infection incidence of 0.12% while those caught off Washington (areas 72-75) had an incidence 5 times higher, 0.61%. Broken down by season (Jan.-June versus July-Dec.) the incidence of infection off Washington dropped from 1.6% during the first half of 1975 to 0.46% during the last half. Off Oregon, the comparable figures were 0.15% and 0.08%. These figures could give a rough indication of the mortality rate of infected shrimp during the year.

The breakdown of infection incidence by parasite species was remarkably constant from area to area (Table 2). This indicates that the differences in incidence between areas are not due to differences in the success of individual parasite species. Neither are they due to differences in the effects of the parasite on the host; no parasite species is more pathogenic to shrimp than another.

The implications of the results so far are not clear. The fact that the incidence of infection off Washington is about five times greater than it is off Oregon is interesting. This may be related to shrimp population size and therefore to fishing pressure. It is logical to assume that parasite incidence will be higher in areas of high shrimp

population densities since parasite transmission should be more easily accomplished. However, the actual mechanism of microsporidan transmission in shrimp remains unknown. Preliminary results of work we are doing on microsporidan transmission in sand shrimp (Crangon spp.) indicates that trans-ovarian transmission may be one mechanism. This, unfortunately, is inconsistent with another preliminary observation, namely that heavily infected sand shrimp rarely carry eggs. It is hoped that further study will provide answers for these and other questions concerning shrimp and their microsporidan parasites.

Table 1. 1975 microsporidan infections in Pandalus jordani. Total shrimp examined 18,757. Total infections found 49. Percent infected 0.26%.

| Infections according to area |                 |                  |                  |           |                 |                  |                  |
|------------------------------|-----------------|------------------|------------------|-----------|-----------------|------------------|------------------|
| Washington                   |                 |                  |                  | Oregon    |                 |                  |                  |
| PMFC area                    | Shrimp examined | Infections found | Percent infected | PMFC area | Shrimp examined | Infections found | Percent infected |
| 72                           | 445             | 2                | .45%             | 82 & 84   | 5,027           | 2                | .04%             |
| 74                           | 3,417           | 20               | .59%             | 86        | 7,413           | 11               | .15%             |
| 75                           | 1,527           | 11               | .72%             | 88        | 928             | 3                | .32%             |
| Total                        | 5,389           | 33               | 0.61%            | Total     | 13,368          | 16               | 0.12%            |

  

| Infections according to season |     |    |      |         |       |    |       |
|--------------------------------|-----|----|------|---------|-------|----|-------|
| Early 1975 (Jan.-June)         |     |    |      |         |       |    |       |
| 72                             | -   | -  | -    | 82 & 84 | 1,670 | 2  | 0.12% |
| 74                             | 200 | 6  | 3.0% | 86      | 4,835 | 7  | 0.14% |
| 75                             | 470 | 5  | 1.1% | 88      | 792   | 2  | 0.25% |
| Total                          | 670 | 11 | 1.6% | Total   | 7,297 | 11 | 0.15% |
| Total Oregon & Washington      |     |    |      |         | 7,967 | 22 | 0.28% |

  

| Late 1975 (July-Dec.)     |       |    |       |         |        |    |       |
|---------------------------|-------|----|-------|---------|--------|----|-------|
| 72                        | 445   | 2  | 0.45% | 82 & 84 | 3,357  | -  | -     |
| 74                        | 3,217 | 14 | 0.44% | 86      | 2,578  | 4  | 0.16% |
| 75                        | 1,057 | 6  | 0.57% | 88      | 136    | 1  | 0.74% |
| Total                     | 4,719 | 22 | 0.46% | Total   | 6,071  | 5  | 0.08% |
| Total Oregon & Washington |       |    |       |         | 10,790 | 27 | 0.25% |

Table 2. Distribution of infections among parasite genera.

| Northern Area (PMFC Areas 72-75) |              |                              |     |
|----------------------------------|--------------|------------------------------|-----|
| Early Sample (Jan.-June 1975)    |              | Late Sample (July-Dec. 1975) |     |
| Nosema                           | 18%          | Nosema                       | 18% |
| Pleistophora                     | 9%           | Pleistophora                 | 9%  |
| Thelohania                       | 73%          | Thelohania                   | 73% |
| Southern Area (PMFC Areas 82-88) |              |                              |     |
| Early Sample (Jan.-June 1975)    |              | Late Sample (July-Dec. 1975) |     |
| Nosema                           | 27%          | Nosema                       | 20% |
| Pleistophora                     | 9%           | Pleistophora                 | 20% |
| Thelohania                       | 64%          | Thelohania                   | 60% |
| Total Early Sample               |              | Total Late Sample            |     |
| Nosema                           | 23%          | Nosema                       | 19% |
| Pleistophora                     | 9%           | Pleistophora                 | 11% |
| Thelohania                       | 68%          | Thelohania                   | 70% |
| Overall Sample                   |              |                              |     |
|                                  | Nosema       | 20%                          |     |
|                                  | Pleistophora | 10%                          |     |
|                                  | Thelohania   | 70%                          |     |