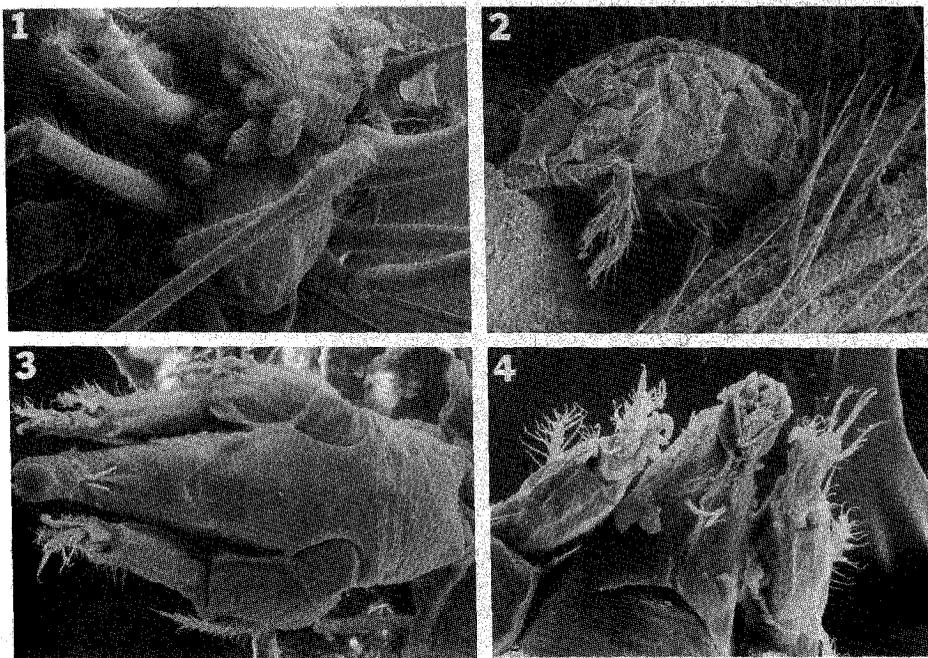


**MITE PARASITISM OF THE POLYMORPHIC SPIDER,
ENOPLIGNATHA OVATA (ARANEAE, THERIDIIDAE),
FROM COASTAL MAINE**

INTRODUCTION AND METHODS

The theridiid spider *Enoplognatha ovata* (Clerck) is a common inhabitant of weedy vegetation along the northeastern seaboard of North America. Recent research into the ecological genetics of color polymorphism in *E. ovata* in Maine populations (Reillo and Wise 1988a, b, c) has uncovered considerable parasitism of this species by larval Parasitengona mites. Here I present parasitism frequencies for color morphs of mature female spiders from 15 natural populations.

Thirty-five coastal Maine populations of *E. ovata* were censused during mid-August from 1986-1987. Populations were distributed between Boothbay, ME (43°50' N. Lat./69°37'W. Long.) and Acadia National Park at Mt. Desert Island (44°25' N. Lat./68°15' W. Long.) (see map in Reillo and Wise [1988b]). Descriptions of the color phenotypes and life history of *E. ovata* can be found elsewhere (Seligy 1971; Oxford 1976; Wise and Reillo 1985), and censusing techniques for estimating morph frequencies are discussed in Oxford (1976, 1985a, b) and Reillo and Wise (1988b). Spiders were examined for mites in the



Figures 1-4.—Scanning electron micrographs of *E. ovata* host and Parasitengona mites: 1, adult female spider with trombidid mites clustered on opisthosoma (32X magnification); 2, trombidid mite with gnathosoma attached to host at left (260X); 3, gnathosoma of erythraeid mite, dorsal view (940X); 4, gnathosoma, ventral view, showing subcapitalum and palps (1500X).

field with the naked eye. Samples of hosts and mites were preserved in alcohol or by freezing. Specimens were identified by W. Calvin Welbourn, curator at the acarology laboratory of Ohio State University.

RESULTS AND DISCUSSION

Two families of mites were found among the samples: Trombididae, likely *Trombidium auroraense* or a close relative (Figs. 1, 2); and Erythraeidae, probably of the genus *Leptus* (Figs. 3, 4). Mites were encountered only as larvae (six legs), bright orange in color, usually attached to the host on the dorsal side along the margins of the carapace or on top the opisthosoma, with clusters often nestled on or adjacent to the pedicel (Fig. 1). Total body length ranged from 0.20 mm to >1.0 mm and varied with the extent of engorgement. The number of mites per host was not scored in the field, but examination of preserved specimens usually revealed one or several larvae/host, with occasional heavy loadings in excess of 15 larvae/host.

Since not all mites scored in the field were collected and identified, I will present gross parasitism frequencies for both mite families collectively. Mites were found among 15 of the 35 censused populations (Table 1). The frequency of parasitism among mature females was highly variable for affected populations, ranging from 0.1% to 20.7% (mean \pm SE for all populations and years = 0.057 ± 0.012). Mites were also observed among immature spiders of both sexes and mature males, but small sample sizes for these categories prohibited estimating parasitism frequencies. No clear association between mite incidence and environment could be detected; however, populations inhabiting edge vegetation along open fields or areas beneath sparse canopy appeared to consistently contain mites whereas shaded populations were generally found to be mite-free.

Parasitism frequencies did not change significantly between 1986 and 1987 for three of five populations having frequencies $\geq 3\%$ for both years (populations BPP, NL1, MP; Table 1; Chi-squares ≤ 1.46 , $df = 1$, continuity correction, $P \geq 0.226$). For the other two populations, parasitism in one (population DM) more than doubled (Chi-square = 6.74, $df = 1$, continuity correction, $P = 0.009$), while in the other (population NL2) it decreased by nearly half (Chi-square = 7.73, $df = 1$, continuity correction, $P = 0.005$).

I found no evidence of differential parasitism of color morphs of the host *E. ovata*. For populations in which phenotype and parasitism frequencies were sufficient to conduct contingency chi-square tests (populations MP, NL1, NL2, DM; Table 1), parasitism was random with respect to phenotype in 1986 (Chi-squares ≤ 4.07 , $df = 2$, $P \geq 0.131$) and 1987 (Chi-squares ≤ 4.66 , $df = 2$, $P \geq 0.097$). I also found no evidence that parasitized females reproduced less successfully than non-parasitized females. For populations with total number of parasitized females ≥ 10 (Table 1), there was no difference between the relative proportions of unparasitized females with egg sacs and parasitized females with egg sacs in 1986 (Chi-squares ≤ 0.106 , $df = 1$, continuity correction, $P \geq 0.744$) or 1987 (Chi-squares ≤ 0.544 , $df = 1$, continuity correction, $P \geq 0.461$). It is of course impossible to determine from my data whether parasitism may have adversely affected fecundity via decreased egg production or may have rendered females more susceptible to mortality prior to ovipositing. However, these data

Table 1.—Morph frequencies and incidence of mite parasitism among coastal Maine populations of mature female *E. ovata*. LIN = *lineata* phenotype; RED = *redimita* phenotype; OVA = *ovata* phenotype; ES = total number of females with egg sacs; "M" refers to number of individuals with mites in each category; %M = frequency of parasitism for sample size *N*. Egg sac data given only for populations with total #M \geq 10.

| POPN/YR | LIN | | RED | | OVA | | Combined | | | ES | |
|---------|------|------|-----|------|-----|------|----------|-------|---------|------|-------|
| | N | (M) | N | (M) | N | (M) | N | (M) | (%M) | N | (M) |
| GCP/86 | 181 | (12) | 5 | (0) | 0 | (0) | 186 | (12) | (0.065) | 184 | (12) |
| SS/86 | 221 | (1) | 3 | (0) | 0 | (0) | 224 | (1) | (0.004) | | |
| MH/86 | 197 | (2) | 6 | (0) | 0 | (0) | 203 | (2) | (0.010) | | |
| MH/87 | 170 | (1) | 4 | (0) | 0 | (0) | 174 | (1) | (0.006) | | |
| BPP/86 | 202 | (23) | 4 | (0) | 0 | (0) | 206 | (23) | (0.112) | 206 | (23) |
| BPP/87 | 196 | (21) | 3 | (0) | 0 | (0) | 199 | (21) | (0.106) | 131 | (10) |
| DC/87 | 2485 | (4) | 203 | (0) | 87 | (0) | 2775 | (4) | (0.001) | | |
| DM/86 | 155 | (9) | 17 | (1) | 5 | (0) | 177 | (10) | (0.056) | 175 | (10) |
| DM/87 | 194 | (24) | 29 | (7) | 4 | (1) | 227 | (32) | (0.141) | 152 | (24) |
| NL1/86 | 840 | (35) | 189 | (10) | 75 | (6) | 1104 | (51) | (0.046) | 1088 | (48) |
| NL1/87 | 1535 | (53) | 244 | (9) | 138 | (8) | 1917 | (70) | (0.037) | 1038 | (44) |
| NL2/86 | 435 | (82) | 105 | (29) | 35 | (8) | 575 | (119) | (0.207) | 543 | (106) |
| NL2/87 | 481 | (54) | 93 | (8) | 55 | (11) | 629 | (73) | (0.116) | 305 | (40) |
| NL3/86 | 204 | (2) | 63 | (0) | 27 | (0) | 294 | (2) | (0.007) | | |
| NL3/87 | 253 | (3) | 47 | (2) | 26 | (2) | 326 | (7) | (0.021) | | |
| MP/86 | 238 | (25) | 25 | (1) | 4 | (0) | 267 | (26) | (0.097) | 263 | (26) |
| MP/87 | 576 | (67) | 59 | (10) | 17 | (0) | 652 | (77) | (0.118) | 369 | (46) |
| OCR1/86 | 127 | (3) | 32 | (2) | 4 | (0) | 163 | (5) | (0.031) | | |
| OCR2/86 | 59 | (2) | 15 | (0) | 1 | (0) | 75 | (2) | (0.027) | | |
| OCR4/86 | 38 | (2) | 7 | (0) | 2 | (0) | 47 | (2) | (0.043) | | |
| J/86 | 209 | (1) | 13 | (0) | 2 | (0) | 224 | (1) | (0.004) | | |
| C/87 | 194 | (0) | 38 | (2) | 9 | (0) | 241 | (2) | (0.008) | | |

suggest that parasitism by *Parasitengona* larvae to not provide a selective mechanism for maintenance of color polymorphism in coastal Maine *E. ovata* populations.

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Paul R. Reillo¹, Department of Biological Sciences, University of Maryland, Baltimore County Campus, Catonsville, Maryland 21228 USA.

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¹Current address: Department of Zoology, University of Maryland, College Park, Maryland 20742 USA.