

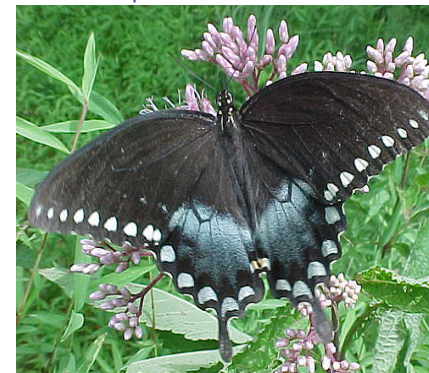
Junonia coenia

## Wing Scale Comparison In Two Butterfly Species, Junonia coenia and Papilio troilus

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Papilio troilus

### Abstract

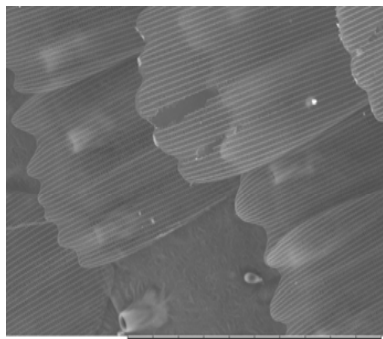
The butterflies Junonia coenia and Papilio troilus were collected at the Big Thicket National Preserve. They were found to have similar traits in scale design on different portions of the ventral and dorsal forewing. The data indicated that there is more variation in the shape of the scales on different parts of the forewing within a species than between species.

### Introduction

Junonia coenia (J. coenia) lives within open meadows with sparsely populated plants and much brush. It has camouflage and eyespots to protect it from predators. Papilio troilus (P. troilus) lacks poison, camouflage, or eyespots to protect it from predators. Papilio troilus stands out in the forest by mimicking the pipe vine swallowtail (Battus philenor), a very poisonous butterfly. The goal for this project was to determine the difference between butterfly scales on the forewing J. coenia and P. troilus.

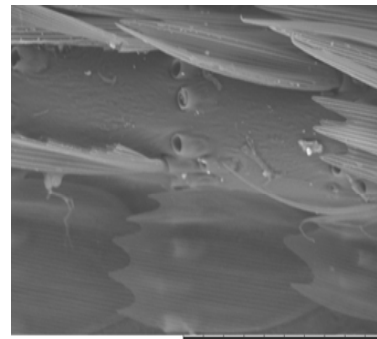
### Methods

Specimens were collected using nets at several units in the Big Thicket National Preserve (Big Sandy, Lance-Rosier, and Turkey Creek). A total of 26 different species of butterflies were caught including P. troilus and J. coenia. The butterflies were prepared for examination using the Scanning Electron Microscope by carefully removing the forewing from J. coenia and P. troilus for comparison of the scales on the dorsal and ventral surfaces. Scales were examined using Hitachi TM-1000 and S-3400N microscopes.



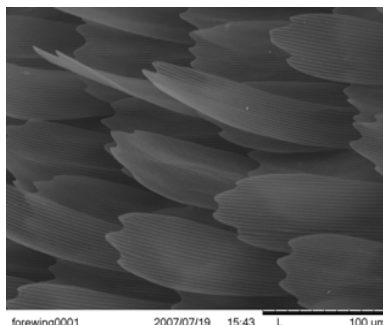
bk scales0002 2007/06/26 08:52 L 100 um  
buckeye scales upperwing

Figure 1 J. coenia, scale structure. Near an eyespot on the forewing



bk scales0006 2007/06/26 09:03 L 100 um  
upper portion of a bk bfy wing

Figure 2 J. Coenia upper portion of wing. Veins on wings on the underside of the forewing.



forewing0001 2007/07/19 15:43 L 100 um  
spicebush swallowtail forewing

Figure 3 P. Troilus. Forewing

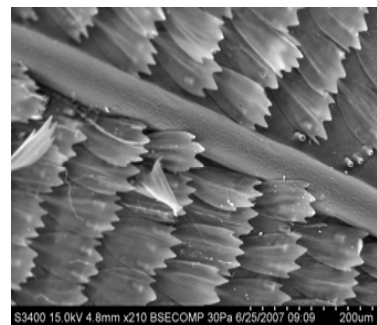


Figure 4 P. Troilus, vein and scale structure.

### Discussion

The results did not support my hypothesis that there would be differences between butterfly scales on the forewing. The scales for the P. troilus were uniform across both sides of the forewing. However for J. coenia, the scale design was different in each section of its forewing because of the varying colors resulting in more of a variation in scale patterns. My results were consistent with those of Janseen et al (2001), who found similar traits in scale arrangement, concluding that there is greater variety in scales organization within a specimen than between two species.

### Literature Cited

Janssen M., Monteiro A. & Brakefield P. 2001. Correlations between scale structure and pigmentation in butterfly wings. Evolution & Development, 3.6: 415-423.

### Acknowledgments

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### Results

Scales of J. coenia were flat with round lobes near the eyespots (Fig. 1). However, when the scales were closer to the edge of the forewing, they became larger and more curved (Fig. 2). The veins of J. coenia were covered by scales on ventral surface of the forewing (Fig. 2). The scales were rounded in some areas and pointed in other. Scales had three to five lobes. The scales of P. troilus (Fig. 3) had similar pointed lobes at the end of the scale, similar to the scales found in J. coenia (Fig. 1). The scales on P. troilus did not cover the veins of the forewing (Fig. 4). When the scales were close to eyespots or colored areas, the scales were larger.

