

The distance that the nymphs crawl above the water surface appears to be related to the wave action (splash condition) of the water. Nymphs emerging in the field crawled farther above the water to find a dry surface than did those in the laboratory.

The emergence process began with a small medial split of the thoracic notal shield. The abdominal segments contracted repeatedly in a peristaltic fashion followed by the outward bulging of the thorax until the entire middle medial line of the mesothoracic notal shield opened. The split gradually progressed anteriorly and posteriorly. Anteriorly it reached the vertex of the head, usually between the compound eyes along the obscured ecdysial line, but sometimes extended to the base of the frontal process of the head. Posteriorly the split terminated at the posterior margin of the median carina. As the split progressed, the subimago wriggled out from the old skin. The dorsum of the subimaginal thorax emerged first, followed by the compound eyes and then the head. At this point the emerging subimago assumed a slanted position with the head and anterior half of the thorax completely exposed, and the abdomen still encased in the old cuticle. Quick jerky body movements and abdominal contractions completed the process with the release of the abdominal segments and caudal filaments. Sometimes the subimago spread out its prothoracic legs immediately upon exposure and firmly anchored the claws on the supporting objects. This probably helped the emerging subimago pull itself from the nymphal skin. Normally the prothoracic legs and the mesothoracic legs remained firmly drawn under the venter of the thorax until the metathoracic legs appeared and all three pairs spread out at the same time. At emergence the wings of the subimago were moist and often curled at the apex.

A newly emerged subimago remains motionless for awhile, and then crawls up on the supporting object. This resting behavior probably allows the subimago time to regain its strength and dry its wings.

#### FLIGHT ACTIVITIES

The subimagos of *B. rogersi* have a unique flight pattern (Fig. 23). They dive to the water surface and then fly vertically up into the air. The functional significance of this behavior remains unknown. The subimagos are strong flyers, flying up out of sight in a few seconds. Their ability to fly fast perhaps helps them avoid predators.

#### DURATION

The duration of the subimaginal stage of *B. rogersi* at laboratory temperatures ranged from 11 hr 50 min to 30 hr, averaging 21 hr. 21 min.