

PHENOLOGY AND LIFE CYCLES  
OF SOME COCCINELLID SPECIES

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**Annotation.** This article explores the phenology of certain species within the Coccinellidae family, focusing on aspects such as dormancy, active life stages, generational frequency, and overwintering phases of beetles, all of which are closely associated with climatic factors and geographic distribution.

***Coccinella septempunctata* (Linnaeus, 1758)** – is a polyvoltine species and one of the most common in the Kashkadarya region. As a cosmopolitan species, we examined its life cycle by comparing our findings with existing literature. *Coccinella septempunctata* beetles are typically found at the base of trees or within hollows and burrows, and less frequently under stones. Our observations in the Yakkabog and Kitab Districts, conducted from late September to early October (coordinates: 39°24'29"N, 66°43'32"E at an elevation of 423 m), indicated that these beetles often inhabit areas with sparse vegetation and are increasingly moving into open village areas. In October, we observed flocks of 54 to 117 individuals of *Coccinella septempunctata* among stones, pebbles, and gravel along the Okdarya River near Yangiariq Sandstone in the Kitab District of Kashkadarya. These flocks were seen migrating toward the village. Furthermore, in the Karshi, Nishon, Kasbi, and Beshkent Districts, which are part of the Karshi Desert, migrations of these beetles to rural areas were recorded at the end of October, continuing into early November. Our observations indicated that the spring emergence period of *Coccinella septempunctata* spans a wide range and varies with vertical zonation. This beetle species is among the first to emerge in overwintering areas compared to other coccinellids and becomes particularly active by March. In warmer winters, beetles emerging from hibernation have occasionally been observed as early as February. However, as spring progresses, their activity decreases as they seek sheltered areas.

*Coccinella septempunctata* undergoes three developmental stages before reaching maturity: egg, larva, and pupa. Mating, which initiates the first generation, occurs in early spring when the beetles are most active. The egg-laying period extends over a month, with females laying elongated, oval, yellow eggs, typically numbering between 31 and 67. Eggs are densely and consistently deposited on leaves and tree trunks. Foreign literature reports that *Coccinella septempunctata* lays between 200 and 300 eggs. According to F.R. Khakimov [1], the egg-laying period for *Coccinella septempunctata* in Tajikistan occurs after winter diapause, specifically from April 5 to May 10, lasting for 35 days. The hatching of larvae from the eggs takes place between April 10 and May 25, with this process lasting for 45 days. Observations indicate that molting for the first generation occurs from May 5 to May 30 (25 days) across different zones. Consequently, the total duration of one generation is 55 days, from April 5 to May 30 [1].

In our study area, the larvae transition through three molts to reach the fourth instar, a process that lasts between 13 and 16 days. During the final stage of the larval phase, there is a 24-hour pre-pupation period during which the larvae remain inactive and do not feed. The body shape changes, becoming compact and slightly bent. In Europe and other northern and western regions, researchers have noted that larvae emerge from eggs in 10 to 11 days due to an average air temperature of 15-18°C. In the study area, the first generation of beetles appears in late April and early May. The emergence of the second generation corresponds to the second and third decades of April, during which females lay their eggs in a dense and orderly manner. This process has been observed to accelerate due to favorable climatic conditions and the abundance of nutrients available for the development of the second generation. The second generation is expected to complete its development by mid-June. It has been found that *Coccinella septempunctata* produces three generations under the conditions of the study area, with mating and egg-laying for the last generation observed in the first decade of August. Only trivoltine species produce a third generation [2, 3].

***Hippodamia variegata* (Goeze, 1777)** is a polyvoltine species found in agrobiocenoses and grasslands within the study area. According to our observations, the emergence of these ladybugs from rural areas occurs in the first decade of March. The beetles begin laying eggs in the last decade of March, with the first larvae appearing after 8 to 10 days. The first generation of beetles emerges in late April and May. Adult beetles of the first generation mate quickly, during which mass reproduction is observed, followed by the egg-laying process. The number of eggs laid by female beetles depends on their size; smaller females lay approximately 10 to 12 eggs, while larger females lay around 14 to 16 eggs. These beetles remain highly active throughout their lifespan and can produce up to three generations, depending on climatic conditions. As temperatures drop, the insects' activity decreases, prompting them to prepare for winter by seeking shelter under fallen leaves or the bark of trees in the village [2, 3, 4, 5].

***Propylaea quatuordecimpunctata* (Linnaeus, 1758)** is a bivoltine species and one of the most common species across all study areas. It is particularly prevalent in agricultural crops, primarily found on herbaceous plants rich in aphids. However, it can also be spotted on trees during early spring and early summer. Depending on climatic conditions, these beetles emerge from hibernation at the end of February or in March. Initially, they inhabit weeds

before migrating to agricultural crops, where they feed on aphids and the females begin to lay eggs. From the end of March to early April, the females start laying their eggs in small clusters of 10 to 15 on grass plants, with egg-laying occurring at weekly intervals. Larvae emerge from the eggs after approximately two weeks, and a mass release of larvae is observed at the end of March. It has been noted that the beetles in the study area produce two generations. As temperatures drop, the beetles seek shelter under trees, fallen leaves, and dried plant remains near the fields where they previously resided.

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