

# [Insect have varied preferences for different hosts. previous](https://assignbuster.com/insect-have-varied-preferences-for-different-hosts-previous/)

[Psychology](https://assignbuster.com/essay-subjects/psychology/), [Behaviorism](https://assignbuster.com/essay-subjects/psychology/behaviorism/)

Insect populations that use different localhost plants frequently show divergent egg laying or feeding preferences on those hosts(Bernaysand Chapman 1994). Because plants representhabitats as well as food, host–plant variationcould also affect behaviors not directly related to finding or consuming plants (Carrollet al. 1998). Several authors have recentlyaddressed the microevolutionary change is deemed predictable if replicate populationsin a new environment converge towards populations already adapted to thatenvironment (Messina2004). Our results demonstrate thatboth a juvenile trait and an adult trait (host discrimination) in C. maculatus population can be rapidly and predictably modified by a ancestralhost shifting. Furthermore, results revealed that C. maculatus behaviors werelargely affected by the host choice tests, hosts and generation number.

In no hostchoice tests, female C. maculatus were highly attracted by the seeds of chickpeaand cowpea. However, they showed a strong preference for seeds of cowpea onlyin free host choice test. This fitted with Rees (2004) who indicated that the bruchids havevaried preferences for different hosts. Previous works indicated that bruchid species are known to exhibitspecificity in the choice of legumes they attack (Rees 2004). C. maculatus is primarily a pest of cowpea but has many alternativehosts among leguminous seeds (Haouel-Hamdiet al.

2017a). Being a field-to-store pest suggests thatdispersing individuals are guided by specific cues to their preferred hosts (Ajayi etal. 2015).

According to Messina (2004) the oviposition preference is ratherlabile but that a new host is readily accepted after 40 generations. In addition, even after many yearsof laboratory culturing, there is still considerable plasticity in traitsrelated to host use in C. maculatus (Guedes etal. 2003). However, a host shift exposes larvae to acompletely new environment causing changes in larval feeding behavior (Guedes etal. 2003), larval competitive behavior (Tuda andIwasa 1998; Messina 2004), and adult life-history traits (Messina2004). Thus, host shifts lead to adaptations tonew food sources both in the laboratory and in the wild conditions (Tuda et al. 2006).

Female oviposition behavior is known toshow heritable genetic variation and egg-laying preferences in C. maculatus seems to be quite evolutionarylabile in general (Messina2004). On the other hand, Sankara et al. (2010) showed that females of C. maculatuswere able to recognize odors from their egg-laying substrates and to find theirway to the sources of these odors. When these females have the choice betweenclean air and air containing seed odors, they are significantly more attractedto the smell of seeds.

This would be explained by the volatile substancesemitted by the seeds. In addition, Ignacimuthu et al. (2000) confirmed that these chemicals would havean attractive effect on C. maculatus females. In this study, we found rapid evolution of female oviposition behaviorwith an increase in novel host acceptance, in agreement with Wasserman andFutuyma’s (1981) as well as Messina and Karren’s (2003) findings. Most importantly, we observedacceleration in means growth rate and an increase in weight and body size. Thus, evolution of demographic traits to the novel host occurred in concertduring adaptation, together with elevating population fitness on cowpea andlentil.

Previousstudy of Agosta (2008) indicated that in the free host choice test both the survival of offspringand the host seed size showed a positive relationship with the numbers of eggslaid on the seed. However, in the no host choice test, only the survival ofoffspring and the numbers of eggs laid showed a positive relationship, whilethere was a significant correlation between seed size and the number of eggslaid on the seed. The developmental plasticity is illustrated in thisstudy by several biological indicators, which gave evidence of an importantpotential for a relatively rapid adaptation of C. maculatus on the threetested hosts. Other indicators of C. maculatus adaptability to cowpeaseeds came from the extent of larval survival inside the hosts and theintrinsic rate of natural increase.

Although both parameters were higher on chickpeauntil the 4 generation, the increase in the intrinsic rate of increase wasfaster and higher when developing on chickpea compared with cowpea. Furthermore, Sankara et al. (2016) showed that larval mortality was importantinside Bambara seeds, whatever the number of eggs laid, indicating thatacceptability is not always correlated with suitability (Giga andSmith 1987; Shazali 1989). The chemistry of seeds may be the mostimportant factors determining interactions between the development of bruchidsand their host plants (Tuda et al. 2006). Besides, Sankara et al. (2016) showed that females of C. maculatusseem to remember the volatile signals from cowpea, the original host, evenafter three years of adaptation or development on the Arachishypogaea and Cajanus cajan.

Forinstance, if a population has a means to detoxify a particular secondarycompound in a novel host, it may be able to exploit closely related hosts thatcontain similar compounds (Agrawal 2000). According to Nicole (2002), an insect is specific to a plant if itcan first recognize it. This author has shown that C. maculatus was ableto recognize its original host cowpea and to deposit its eggs in all testedsituations (free choice, semi choice and no choice). In addition, this authorhas reported that the transfer of C. maculatus to other legumes and itsmaintenance on these hosts for a relatively long time influences its penchantfor this host, but does not alter its ovipositional preference for the hostplant.