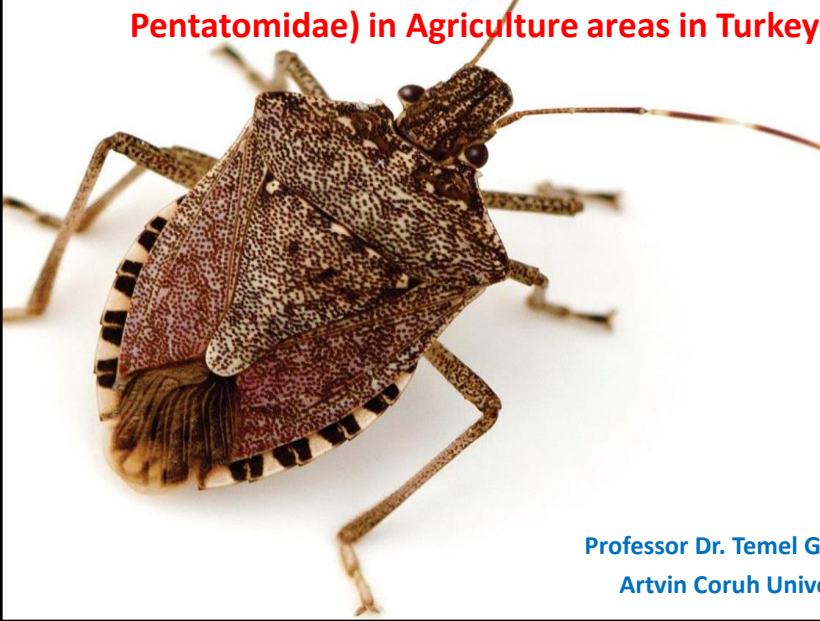


**RED ALERT...****“Problems of *Halyomorpha halys* (Hemiptera: Pentatomidae) in Agriculture areas in Turkey”**

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Artvin Coruh University

Invasive species are a major threat to ecosystems and cause enormous environmental and economic losses. Although it is difficult to estimate the full extent of the environmental damage by exotic species and control costs, it is estimated that invasive species cause billion dollars in losses per year in the World.

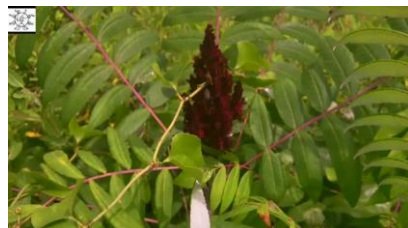
*Halyomorpha halys* is an invasive species of Pentatomidae (Hemiptera) native to Eastern Asia.



- This species was found in recent years many other countries: Şili, Liechtenstein, Germany, France, Hungary, Holland, Greece, Italy, Romania, Austria, Serbia, Slovakia, Spain, Switzerland, United Kingdom; Bulgaria, Russia, Georgia and Turkey .



*Halyomorpha halys* cause very important damages in the trees, fruits and vegetables hosting it in the areas invaded by it; and for this reason, it threatens the fruit and vegetable cultivation in economic terms. Because of its high spread potential in the world and its economic damage in many fruits, it was included in the Quarantine List of EPPO (European and Mediterranean Plant Protection Organization).



\* It passed the Northeastern border of Turkey from Georgia in natural ways; and currently, it is detected only in the city of Artvin; in Kemalpaşa, Hopa, Borçka and Arhavi. It is urgently needed that the risk of invasion by this species in our country, its population density, possible distribution, bio-ecology and control ways of this harmful invader are defined.



### **The biology of *H.halys* under field conditions in Artvin, Turkey is reported this study.**

\*\* *H.halys* can develop 1-2 generations per year. The first eggs clusters were found at the beginning of June and the first larvae of second and third instar were spotted on twenty June, on hazelnuts trees. The overwintered adults laid their first egg mass in mid-May and continued until mid-August.



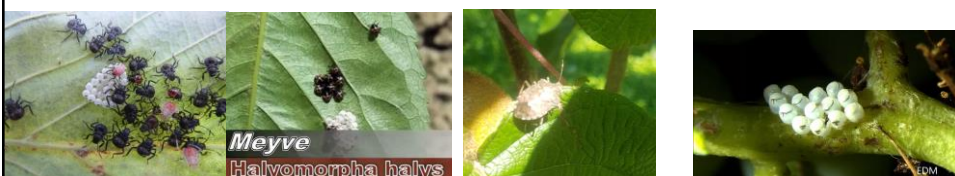
and will also compare the adult to Consperse stink bug,  
*Euschistus conspersus*

Depending on the host plant species, females produce sixty to one hundred seventy eggs by depositing egg masses comprising twenty eight-thirty two eggs each. Nymphs emerged in approximately 5 to 7 days after the eggs were laid. The 5 nymphal stages from hatching to adult took from thirty to fifty five days. Females started laying eggs from fifteen to twenty eight days after their final molt.



The insect completed its 1st generation in seventy eight-ninety-six days. Second generation starts at the end of July, at the end of September

Oviposition peaks in July and ends in late August in Arhavi (Turkey) regions.



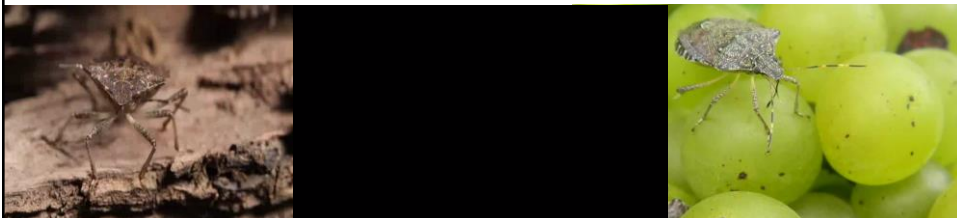
The insect becomes adult stage and overwinters in the adult stage in reproductive diapause, usually in human structures.

\*\* therefore, it is a psychological pest for humans.

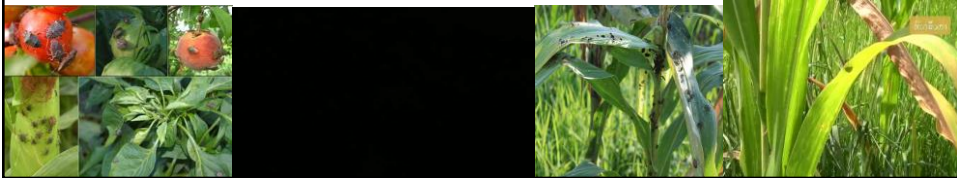


*H. halys* is an extremely polyphagous pest attacking numerous horticultural, agricultural and ornamental plants belonging to different genera.

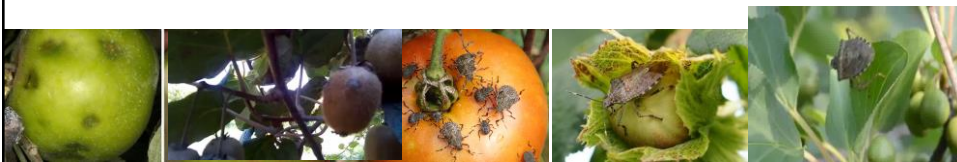
\*\* In the study area (Artvin; Turkey) up to eighty plant species are listed for host of *H. halys*. The most important hosts include fruit trees and bushes such as, kiwi, hazelnut, cherry, plum, apple, pear, *Citrus* spp., mulberry, persimmon and grape; leguminous field crops such as common bean; corn; forest trees such as maple and willow; as well as ornamental trees and shrubs such as butterfly bush and honeysuckle; vegetables such as tomato and pepper.



- Damage to host plants is caused by both adults and nymphs by piercing the surface injecting digestive enzymes and sucking plant fluids. In fruits, feeding injuries include deformities, scars, discolorations and pitting that render them unmarketable.



- Feeding injury by *H. halys* results in seed loss, punctures, fruit deformation, suberization, formation of spongy areas, fruit abortion, necrosis, and also destroyed pods. Adults and nymphs are extremely active and can readily move between different cultivated and ornamental host plants.



### **Management of *H.halys*;**

**\*\*Cultural Control:** *H.halys* has a wide array of host species that support populations including unmanaged woodlots. There is the potential utilize cultural techniques to manipulate pest populations.

Use of trap crops has also been explored with plants such as sunflowers and sorghum representing attractive trap plants.



**Monitoring and sampling.** A number of tactics can be used to sample stink bugs including beat sheeting, sweep netting, visual counts, blacklight traps, and pheromone traps. Therefore, alternative control methods have begun to be investigated. Pheromone traps attracting *H. halys* adults used to monitoring and control. Lure treatment (Methyl (*E,E,Z*)-2,4,6-decatrienoate) significantly affected adult captures.

**\*\* We used this pheromone and there were a total of four hundred twenty adults captured by bottle traps and one hundred sixty adults captured by sticky trap in only 1 week.**



**Biological Control:** Several species of predators and parasitoids have been identified as being active against all life stages of *H. halys* in both its native range in Asia and in the US. Potential predators can include families such as Carabidae, Reduviidae, Cantharidae, Coccinellidae, Forficulidae, Tettigoniidae, and Tachinidae among others. In addition, it has been noted that there are some Araneae that are exhibiting predacious behavior on *H. halys* egg masses. Many of the native Hymenopteran egg parasitoids have fallen into families such as Eupelmidae (*Anastatus spp.*) and Platygastriidae (*Telonomus spp.* and *Trissolcus spp.*).



- **Chemical Control:** Applications of insecticides, especially pyrethroids, organo phosphates, carbamates and neonicotinoids has been the most effective and efficient strategy to manage most stink bug pest species.





- Management of *H. halys* in organic agriculture is even more challenging because growers do not have access to insecticides that are as effective as those used by conventional growers.
- When the agricultural activities are evaluated in Trabzon, Rize and Artvin, it is observed that ten percent of the nut production, sixty one percent of the kiwi production and Ninety-seven percent of the tea production are covered by these cities.



- Primarily these mainstream plants and also the majority of the other plant species growing in this region are under the potential threat of this pest. because, Turkey is the only country that grows tea plants in natural conditions without demanding any chemical control methods.
- Thus, in the cultivation of tea in these regions, the chemical control methods are limited against this species.



- In addition, there is no much study of this species in Turkey.
- I'm experimenting with some bacteria against this harmful species (*Bacillus sp.*, *Thiobacillus thiooxidans*, *Thiobacillus ferrooxidans*, *Acetobacter spp.*, *Lactobacillus spp.*)
- *If we dont want spread this potential pest in Turkey, we must using IPM control system as soon as possible.*



**Thanks....**



**Madloba...**