Natural Enemies as Potential Biological Agents for the Control of Brown Marmorated Stink Bug (BMSB) - *Halyomorpha halys* in Georgia

Natalia Kharabadze

PhD student at Structured DoctorateProgram Sustainable Agriculture and Food system

nkhar2017@agruni.edu.ge.

Nona chkhaidze, Mzagho Lobzhanidze, Medea Burjanadze,

Agricultural University of Georgia, 0159 Tbilisi Georgia

The brown marmorated stink bug (BMSB) - *Halyomorpha halys* (Stål) (Hemiptera: Pentatomidae)

- Is an invasive insect for Georgia, that has spread extensively and establish in new are as Black sea regions of Georgia.

- At present BMSB is very active and characterized by the massive increase and formation of focuses in the large tracts of agrocenosis and urban area (including foliage, coniferous, ornamental plants as well) of West Georgia (WG), where situation is quite alarming at present.

- Georgia is the 5th hazelnut-producing country worldwide after Turkey and Italy (FAOSTAT 2017)

- Following its first detection, BMSB has become a key pest in many crops, especially damages hazelnut orchards and make grate economical lost recent years.

Halyomorpha halys Distribution in Georgia

Research objectives

- Were stablished host plants of *H. halys in* Georgia
- Were Isolated and identificated local natural enemies of *H. halys*
- Were examined natural enemies against *H. halys* in semi-field and laboratory conditions

Research Area

Some interesting locations of expedition

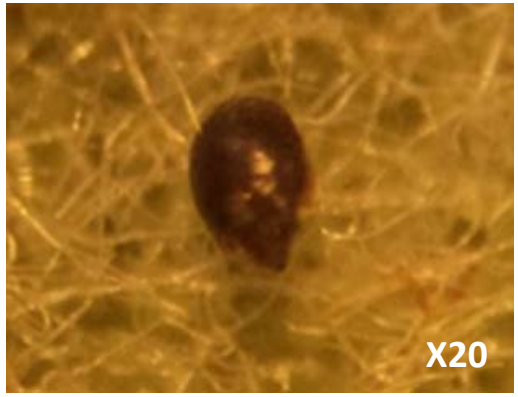
Microclimatic sites : A. The western slope of the mountain, 200m from sea level B. Lowland 80m from sea level.

List of *Halyomorpha halys* Host plants in West Georgia (07.07-15.10.2018)

compere according to with EPPO (last modification 2017) & CABI (Last modified 19 Nov. 2018)

Cultural plants		Ornamental plants		Wilde plants	
Georgia	EPPO/ CABI	Georgia	EPPO/ CABI		EPPO /CABI
	+	Rosa	+	Pueraria	-
	+	Agáve	-	*Rubus canescens*	-

Natural Enemies



Scutellista cyanea

Metaseiulus Egg.

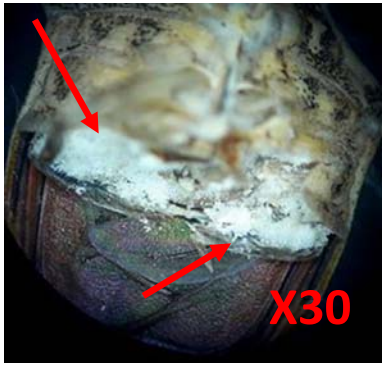
H. halys in spider net

Isolation and Identification Entomopathogenic Fungi

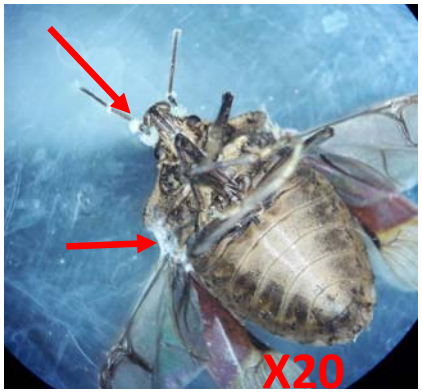
- Fungi cultivated on the artifical media:
  Potato Dextract Agar (PDA),
  Beauveria Selectivmedium (BSM),
  for 10-14 days at 23 ± 2 °C,
  until they developed feature permitting their identification as to species or genus (Humber, 1997; Inglis *et al*., 2012).

- The conidia were stained with lactophenol-cottonblue
  examined light and phase contrast microscopy,
  to accurately detect morphological peculiarities (Zuzi, S120; magnification 400 ×, 1300 ×) for entomopathogenic fungi
  (Evlakhova *et al*., 1961; Rehner *et al*., 2011).

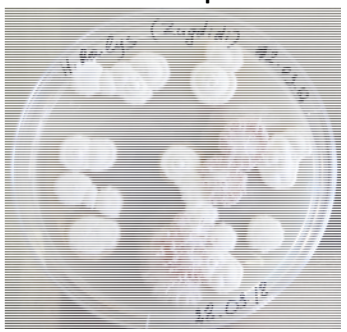
For the molecular diagnostic, that strains are transferred to the USDA ARS Northern Plains Agricultural Research Laboratory, Stefan T. Jaronski, Ph.D. and John Gaskin



Beauveria bassiana



Isaria sp.



Design of Semi-field Assay of BMSB

Origin Culture of Fungi and chemical pesticides

- Indigenous isolates of entomopathogenic fungi
  - *Beauveria bassiana* (MB-082)
  - *Isaria* sp. (MB-011)
  - *Metarhizium* sp.(MB-077)
  - Bi 58 new (chemical)
  - Control (water)
- 2 week-old cultures on PDA (Difco) + 0.01% (w/v) Tween 80
- suspension concentration : $1x10^{8}$ conidia $^{ml-1}$.
- Concentration of Bi 58 new – 0.02%

Experimental biomass

- Adultes of *H. halys*

Kept at :

- environmental condition on the tree
- each strain and concentration were use in 3 replication

Mortality was recorded 11 days after treatment