Republic of Belarus

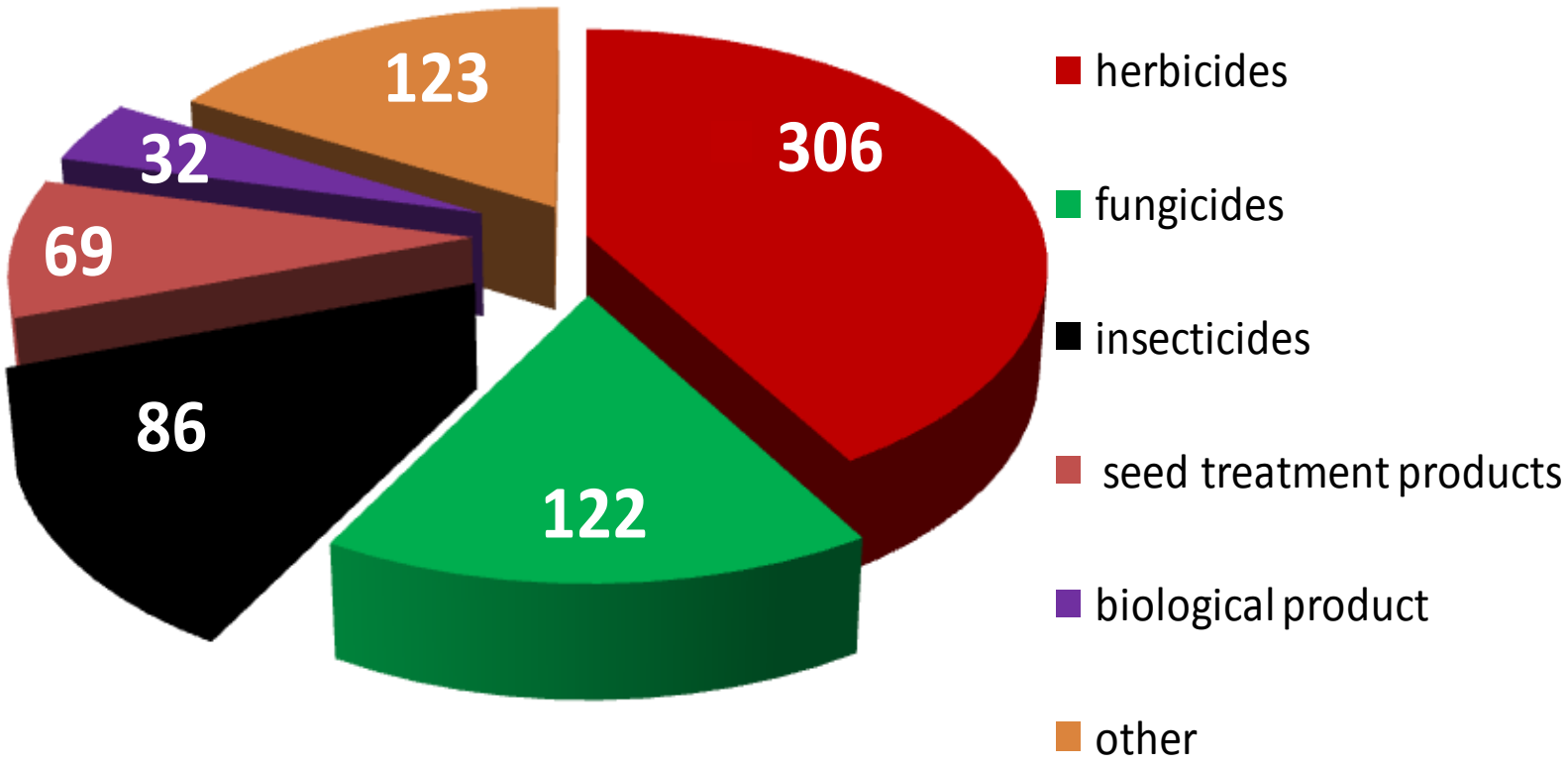
CEUREC FORUM XVIII

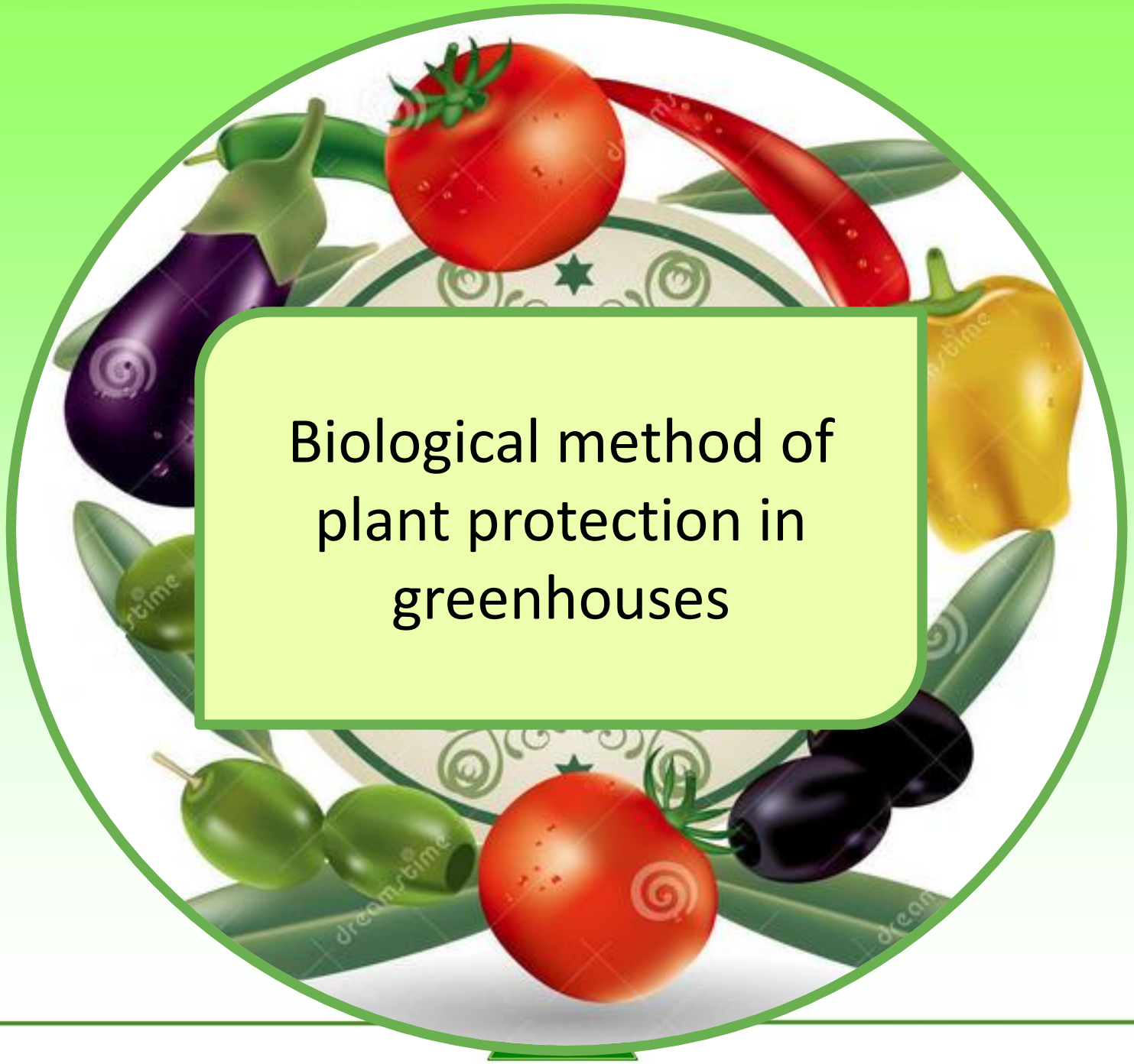
16 -17 October, Poznan, Poland

Biological method of pests control in the Republic of Belarus

The state registration of pesticides in the Republic of Belarus

Total - 738





Biological method of plant protection in greenhouses

Greenhouses in Republic of Belarus

- **24 large greenhouses**
- **Total area of greenhouses:**
  - **248 ha**
- **Volume of vegetables production :**
  about 100 hundreds tons annually
  115 hundreds tons in 2013
- **Vegetables export in 2013:**
  - **More than 30 hundreds tons**
- **Average yield in 2013:**
  - **45,7 kg/m^2**
  - **In the leading farms more than 70 kg/m^2**

Overview of entomophagous - insects used in greenhouses of Belarus

The specific name of entomophage	Applied on crop	The main pests
Orius laevigatus 	❑ Vegetables: ✓cucumber ✓pepper ✓eggplant ❑ Flower crops: ✓rose ✓chrysanthemum ✓gerbera	**Thrips**
Amblyseius swirskii 	❑ Vegetables: ✓cucumber ✓pepper ✓eggplant ❑ Flower crops: ✓rose ✓gerbera	**Greenhouse whitefly** (eggs and larvae) **Thrips** (larvae of the first ages)
Phytoseiulus persimilis 	❑ Vegetables: ✓Cucumber ✓tomato ✓pepper ✓eggplant ❑ Flower crops ❑ Berry crops: ✓strawberries	**Spider mite** (all stages of development)

Overview of entomophagous - insects used in greenhouses of Belarus

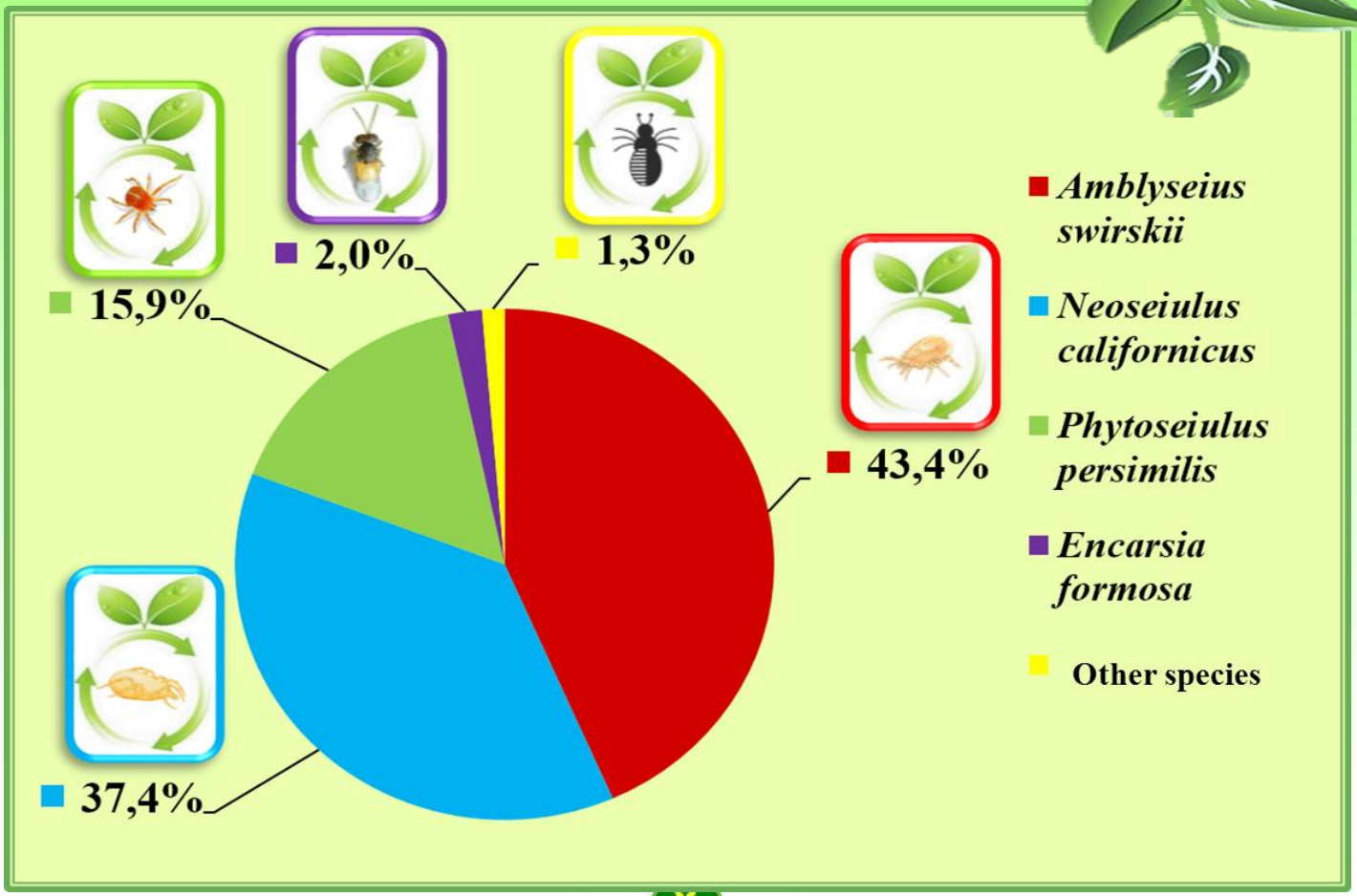
The specific name of entomophage	Applied on crop	The main pests
Neoseiulus californicus 	❑ Vegetables ❑ Flower crops	**Spider mite** (all stages of development)
Nesidiocoris tenuis 	❑ Vegetables: ✓tomato ✓eggpalnt	**Tomato miner mole** (eggs and larvae) **Greenhouse whitefly** (all stages of development) **Spider mite** **Aphids** **Thrips**
Macrolophus caliginosus 	❑ Vegetables: ✓Cucumber ✓tomato ✓pepper ✓eggplant ❑ Flower crops: ✓rose ✓chrysanthemum	**Greenhouse whitefly** (all stages of development) **Spider mite** **Aphids** **Thrips**

Republic Belarus

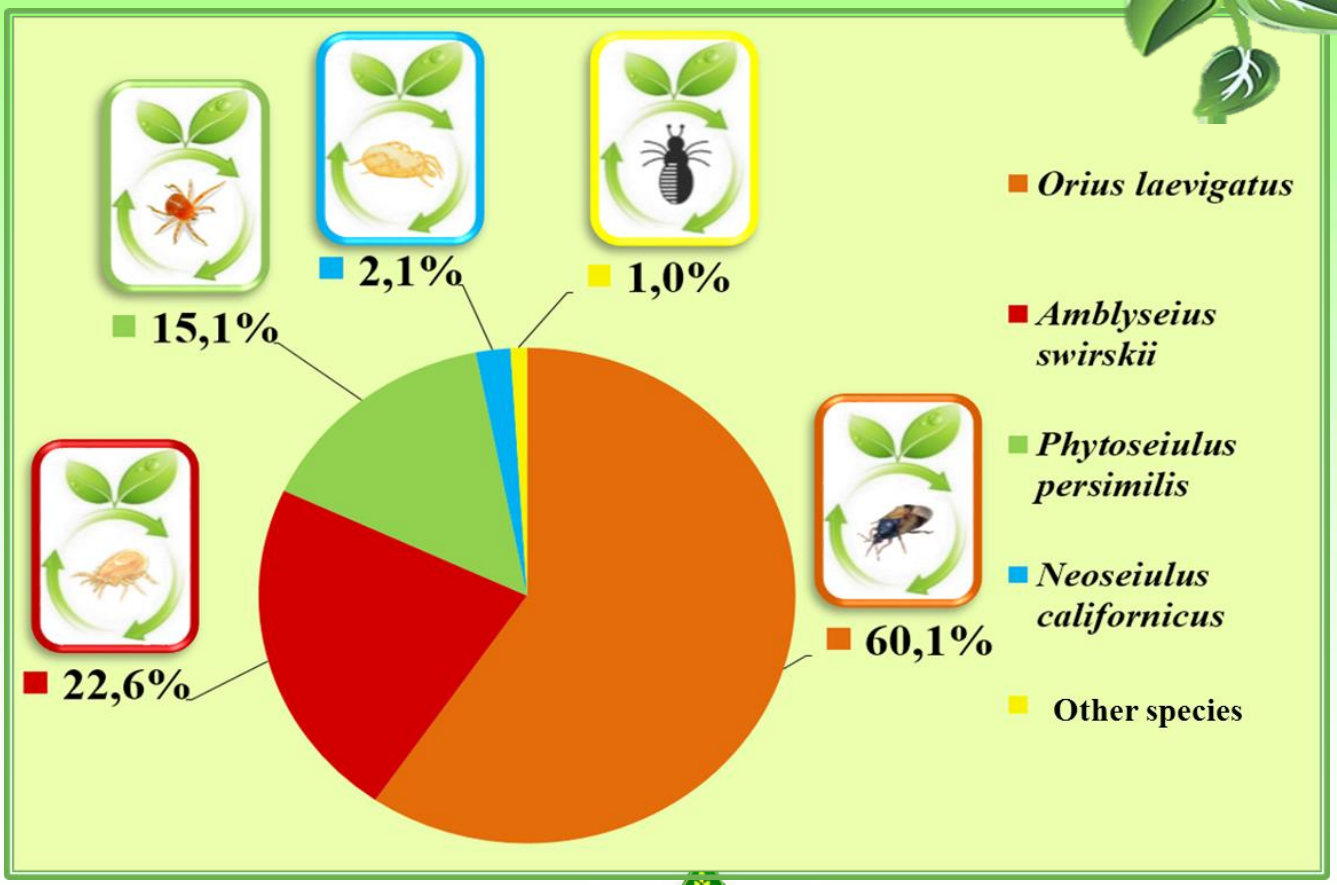
Overview of entomophagous - insects used in greenhouses of Belarus

The specific name of entomophage	Applied on crop	The main pests
Encarsia formosa 	❑ Vegetables: ✓cucumber ✓tomato ✓eggpalnt ❑ Цветочные культуры	**Greenhouse whitefly** (larvae aged 1-3)
Eretmocerus eremicus 	❑ Vegetables: ✓cucumber ✓tomato ✓eggpalnt ❑ Flower crops: ✓gerbera	**Greenhouse whitefly** (larvae aged 1-3)
Aphidius colemani) 	❑ Vegetables: ✓cucumber ✓tomato ✓sweet pepper ❑ Flower crops	**Aphids**

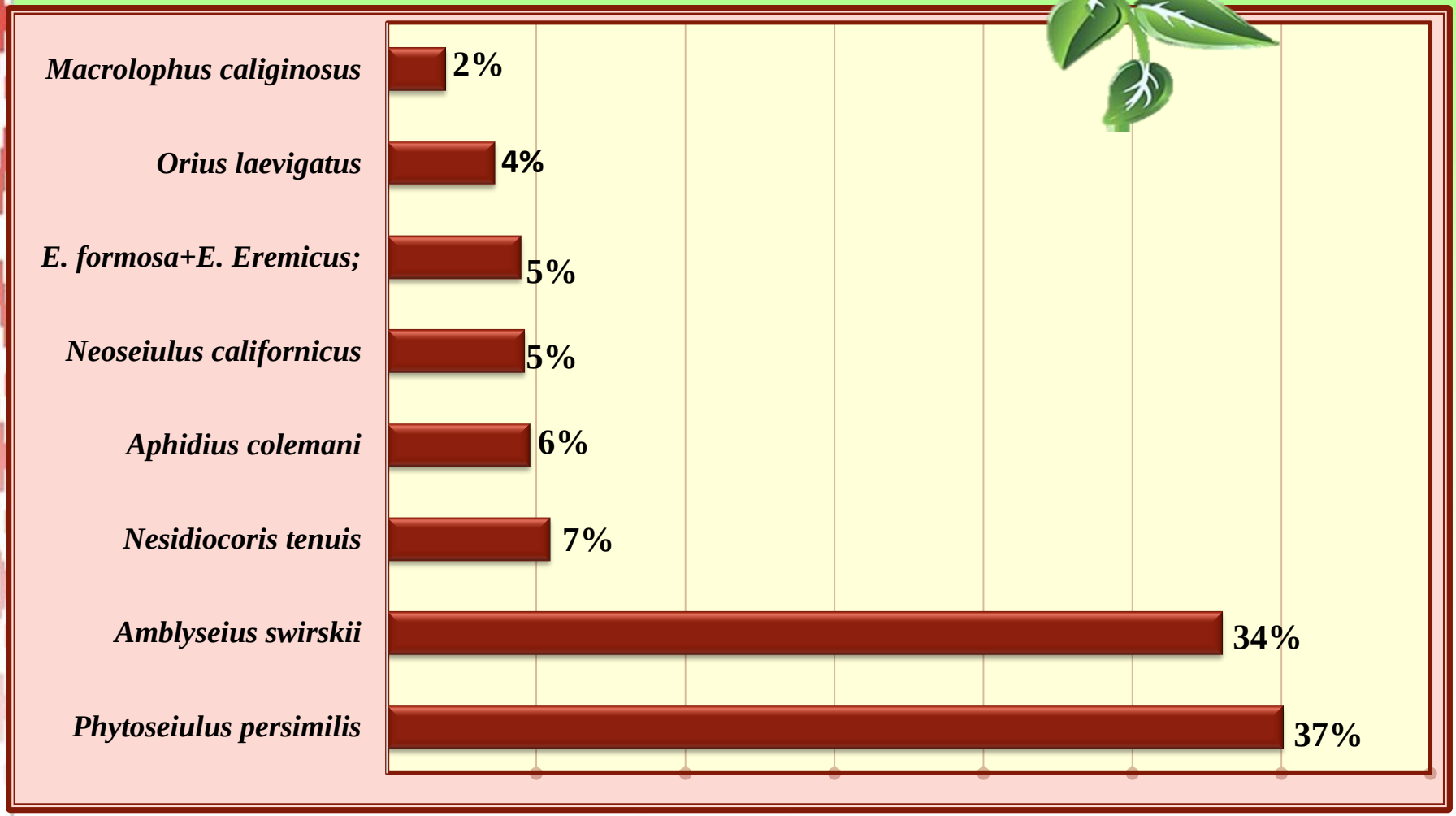
The ratio of entomophagous species used in greenhouses in Belarus



Volumes of application of entomophages in greenhouses



Entomophages applied on 332 ha in greenhouses of Belarus in 2014



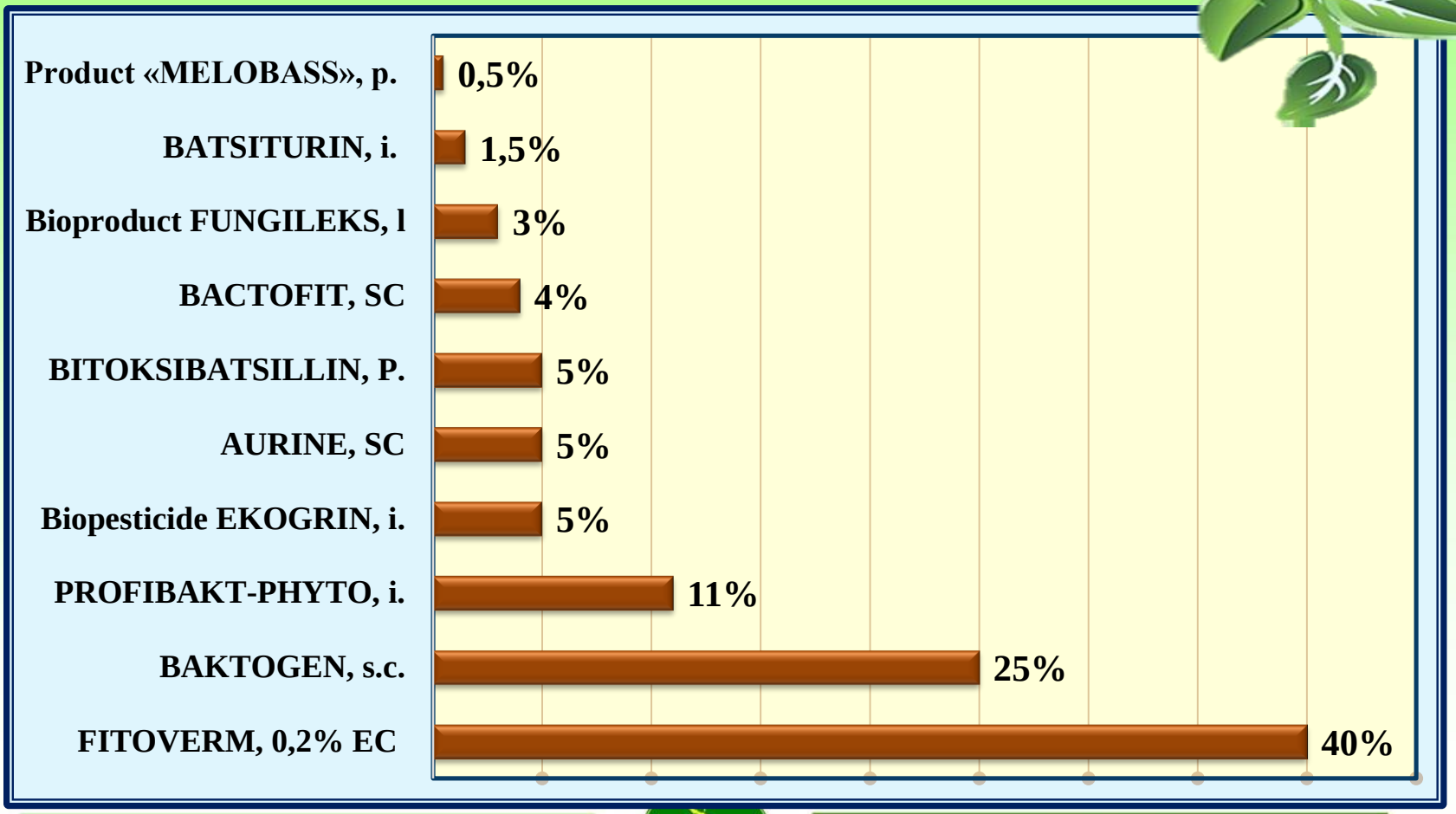
The main biological products applied in greenhouses of Belarus

Trade name of a biological product	Applied on crop	Target pest, disease
Biologicals with insecticide action		
FITOVERM, 0,2% EC (aversectin C, 2 г/l)	❑ Vegetables: ✓ cucumber ✓ tomato ✓ pepper ✓ eggplant	**Spider mite** **Aphids** (peach, melon) **Thrips**
Product «MELOBASS», paste, titers of at least 6 billion spores/g (Beauveria bassiana (Bals) Vuill, strain 10-06)	❑ Vegetables: ✓ cucumber	**The larvae of Diptera pests** (stsiaridy, moth flies, beregovushki)
BATSITURIN,liquid, Titers of at least 4 billion , l. Bacillus thuringiensis, var. darmstadiensis, strain № 24-91),	❑ Vegetables: ✓ cucumber	**Spider mite**
BITOKSIBATSILLIN, powder, BA of at least 1500 EA/mg, content exotoxin 0,6-1,0% Bacillus thuringiensis, var. thuringiensis	❑ Vegetables: ✓ cucumber ✓ tomato	**Spider mite** **Colorado potato beetle** (larvae)
Nematicides		
NEMATSID, SC *Pseudomonas putida*	❑ Vegetables: ✓ cucumber ✓ tomato	**Cyst nematodes**

The main biological products applied in greenhouses of Belarus

Biologicals with fungicide action		
Biopesticide EKOGRIN, l. *Pseudomonas aurantiaca*	❑ Vegetables: ✓ cucumber ❑ Green crops: ✓ dill, parsley	**Root rot, grey mold**
PROFIBAKT-PHYTO, l. *Bacillus sp.* и *Pseudomonas aurantiaca*	❑ Vegetables: ✓ cucumber ❑ Green crops: ✓ dill, parsley	**Root rot**
AURINE, SC *Pseudomonas aurantiaca*	❑ Vegetables: ✓ cucumber, tomato	**Root white and gray rot**
BAKTOGEN, SC *Bacillus subtilis*	❑ Vegetables: ✓ cucumber, tomato	**Bacterial diseases, blackleg, gray mold, kladosporioz, powdery mildew, askohitoz, peronosporosis, root rot**
BACTOFIT, SC *Bacillus subtilis*	❑ Vegetables: ✓ cucumber ❑ Flower crops; ✓ rose	**Root rot, peronosporosis, powdery mildew**
FUNGILEKS, l. *Trichoderma sp.*	❑ Vegetables: ✓ cucumber, tomato ❑ Green crops: ✓ dill, parsley, salad	**Root rot, musty seeds, red-brown spot**
TRIHODERMIN-BL *Trichoderma sp.*	❑ Vegetables: ✓ cucumber, tomato	**Root, white and gray rot, Fusarium and Verticillium wilt**

Biological products applied on 370 ha in greenhouses of Belarus in 2014



Manufacturers of biological products in Belarus:

OJSC “Yeast Plant"

Growth regulator ROSTMOMENT, WG

SFEM "Korenevskaya an experimental forest base IL Academy of Sciences of Belarus"

BREVISIN (Bacillus brevis, strain ИЛАН 362)

SSI "Institute of Genetics and Cytology Academy of Sciences of Belarus "

PROFIBAKT- PHYTO, l (Bacillus sp. BB58-3 и Pseudomonas aurantiaca B-162/255.17 (КМБУ 255)

Bacterial preparations “KLEVERIN”, l (Pseudomonas fluorescens, strain AP267)

OJSC "Bobruisk plant biotechnology"

BAKTOGEN, SC (Bacillus subtilis,штамм 494, /КМБУ 30043/)

STIMUL, SC (Pseudomonas fluorescens S 32, КМБУ 5497)

GULLIVER, SC (Pseudomonas aureofaciens A 8-6 (КМБУ 5498), титр клеток не менее 10^9 /мл + **«Gidrogumat»**, 1%

Manufacturers of biological products in Belarus:

PC "Biogel"

Trichoderma-BL (Trichoderma lignorum, T13-82)

FUNGILEKS biological product (Trichoderma sp. D-11)

Institute of microbiology, National Academy of Sciences of Belarus

Biopesticide Betaprotectin

(Bacillus amyloliquefaciens subps, plantarum)

Biopesticide Fruitin

(**Active ingredients**: spores and antimicrobial metabolites of bacteria Bacillus subtilis.)

Bioinsecticide Baciturin

(Bacillus thuringiensis, var. darmstadiensis)

Biopesticide Phytoprotectin

(**active principle**: spores and antimicrobial metabolites of bacteria Bacillus subtilis with viable spore titer 1-7.10^9)

Biopesticide Ecogreen

(Pseudomonas aurantiaca)

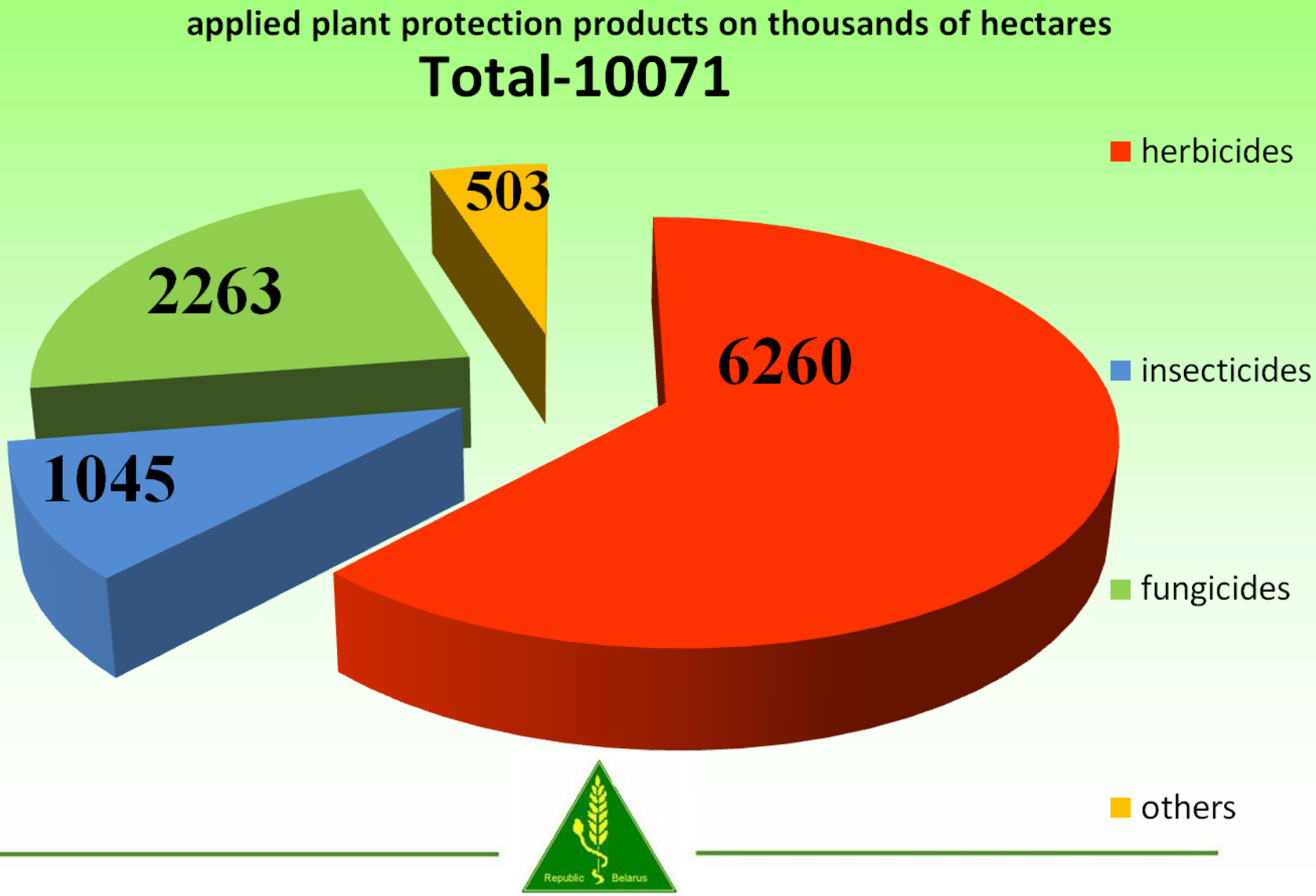
Xantrel

(**active principle of biopesticide:** spores and metabolites of bacteria *Bacillus subtilis* and spore-crystalline complex of bacteria *Bacillus thuringiensis*)

However, in the Republic of Belarus the chemical method is the leading method of pest control.

About 13 thousand tons of plant protection products used annually on the area of not less than 10 million hectares.

Measures taken to protect plants in 2013



In accordance with the legislation in force in Belarus only registered plant protection products are allowed to import, sale, manufacture, storage and use

The oversight function over the management of plant protection products in Belarus assigned to the Ministry of Agriculture and Food and
the State Institution “Main state inspection on seed, quarantine and plant protection"

State plant protection inspectors monitor agricultural crops in order to know the phytosanitary situation,
prevent illegal treatment with pesticides.

All necessary information including legislation of plant protection you can receive on the site :

www.pravo.by;

www.ggiskzr.by

e-mail: rasten@tyt.by

regpest@tut.by

THANK YOU FOR YOUR ATTENTION