Utilization the biological control in greenhouse for controlling the spider mite

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Project Background

In recent years, the Government of Mongolia has been paying close attention to food security and environmental protection as focusing on improving crop productivity, increasing household incomes, reducing poverty and providing healthy and safe products through the introduction of environmentally friendly new technologies for crop production. This policy corresponds to world standards.

Despite the relatively short history of crop production in Mongolia, we have already developed successfully the production of cereals, potatoes and vegetables and have a market for own consumption.

Since the beginning of agricultural production, Mongolia uses only chemical pesticides to protect crops from harmful organisms (insects, mites, diseases, weeds). For example, Mongolia annually imports about 600-1100 tons of pesticides and 30% for pest control in open and protected field, 60% for control of weeds and 20% for control of plant diseases (2017).

Excessive use of chemical pesticides would develop a resistant species of weeds, pests and mites to pesticides, as well as the experience of many countries, soils and products are polluted with residues of chemical pesticides, which can lead to harmful human health.

Also the excessive use of pesticides could cause an outbreak of pests on crop field and affect negatively on microflora and micro fauna of soil. It may kill the natural enemies, which are occurring naturally such as predatory insects, parasitoids and entomopathogenic fungi and bacteria etc.

To reduce the use of chemical pesticides and apply them safely, there is needs of development and introducing the pest controlling technology, which would substitute the chemicals in Mongolia.

The safe and effective pest controlling tool for organic and pesticide reducing crop field is biological control, that described by using the predatory insects and mites and microbes. This technology is not yet developed and applied in Mongolia. For application of predatory arthropods, the mass rearing technology is very important.

For increasing productivity of farming and their income, the farmers need a training on understanding know how of technologies and use it in proper and more effective way for producing the healthy and good quality vegetables.

At the moment, in the greenhouse vegetable production, the most yields reducing pest is the spider mite in Mongolia. For controlling the spider mite in the greenhouse, the releasing the predatory mites are considered as safe and effective control, which is a standard method worldwide since 1922.

The adoption of "New technologies on using the predatory mites" in the greenhouse production of Mongolia, would be an important contribution to the development of know-how of organic pest management technologies for people, who wants to be organic producer and wishes to reduce the pesticide application in their farm.

PURPOSE.

Within this ERASMUS+ support, we would like starting to introduce a safe pest management on mass raring of predatory mite-*Phytoseilus persimilis* and releasing them into greenhouse for controlling the spider mite as pilot new technology.

INPUT:

- To develop the mass raring technology of predatory mite (Phytoseilus persimilis)
- To develop the harvesting technology of predatory mite (Phytoseilus persimilis)-/collecting and packing/
- Releasing technique of of predatory mite (Phytoseilus persimilis)

OUTPUT:

- Biological method for spider mite control in greenhouse as technology. Application of predatory mites is biological technology for organic farming and farming with Integrated Pest Management (IPM) program.
- Pilot technology for organic vegetable production.
- Knowledge and experience about biological control-releasing the predatory mites will be shared by farmer-vegetable producers.
- Technology-Investment for vegetable producers in greenhouse /sustainable production and safe product/
- Safe and trustful products in the market /possible way to increase the farmer income/.

BENEFICIARIES:

-Farmers or vegetable producers in greenhouse.

-Consumers / they need a safe and trustful food/

TARGET AREA /applying the technology\:

- “Chandmani park” in Byanchandmani soum of Tuv aimag-1.
- Green houses in Agropark, MULS

RESPONSIBLE PERSON FOR TECHNOLOGY:

D.Undarmaa, Associate professor, Ph.D , MULS

Time: 2018

METHODS AND MATERIALS;

Human resource need-minimum 3 persons.

Materials:

1. Green house /60 m^2/
2. Cucumber or another crop
3. Predatory mites and other natural enemies

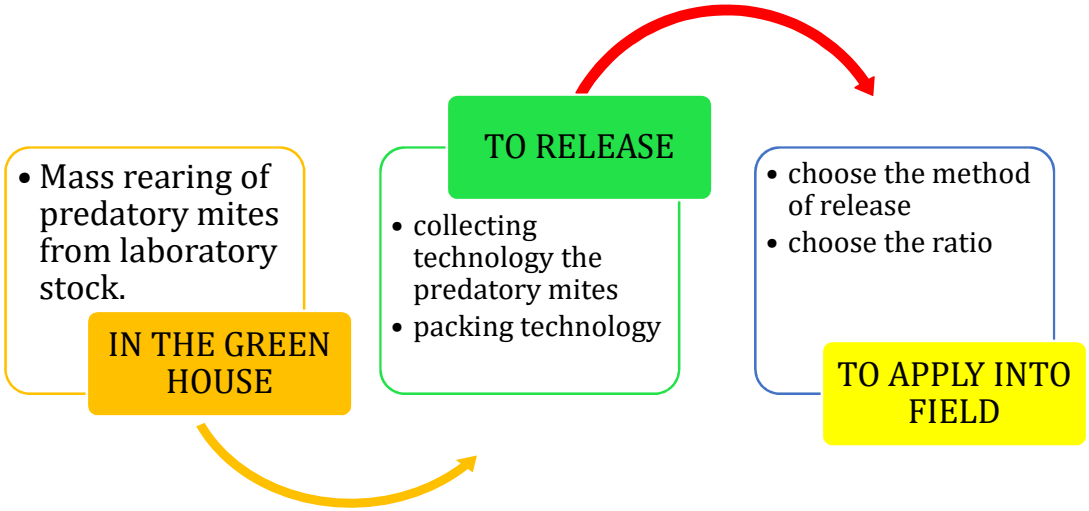
Methods: To apply the predatory mites into green house for controlling 2 spotted spider mite and trips, we are proposing the following jobs.

PURPOSE-1;

The job contains from 2 steps:

1. Mass rearing in the laboratory
2. Field trial

SCHEME OF PREDATORY MITES TO RELEASE INTO THE FIELD



Mass rearing trial:

1. For rearing the predatory mites, we are running two assays such as the prey and predatory mite rearing simultaneously.
2. Growing the beans and use their leaves
3. Apply the reared mites on cucumber plants, which are infested by 2 spotted spider mites for testing the effectiveness and ration of predatory mites.

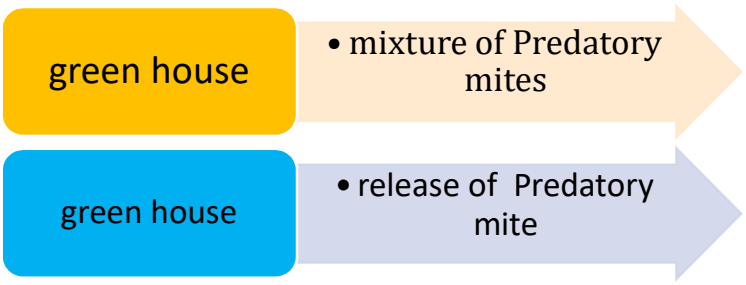
Field trial: In order to suppress the 2-spotted spider mite infestation we will use two predatory mites (*P. persimilis)* .

The following release rates of predatory mites:

• 5 per infested leaf

• 20 per medium sized plant /1,000 per 240 square metre field/.

FIELD TRIAL SCHEME:



In 2018, above mentioned field trials will be done in green houses of Agropark of MULS and Chandmani agropark of Bayanchandmani soum. According to mite infestation rate, it may require an additional releases. Instructions for care and release of predatory mites will be provided at each releasing time.

TENTATIVE BUDGET FOR MATERIALS :

1	**Supplies and Equipment**					
1.1	microscope		1		3,000,000	Invoice will supply
1.2	seed /bio/		1		120000	Invoice will supply
1.3	Petri dish	box	500		350000	Invoice will supply
1.4	soil	bag	2		600000	Invoice will supply
1.4	Other materials	Lum sum			100000	Hygienic, disinfecting solution, gloves, tissues plastic containers ets.
Sub-total Category					**5,070,000**	
GRAND TOTAL WITHIN MAXIMUM FINANCIAL LIABILITY					**8,710,000**	

*Remark; New greenhouse /6x10m/ will be supported by MULS. Part time workers will be 2 persons.

Written by D.Undarmaa