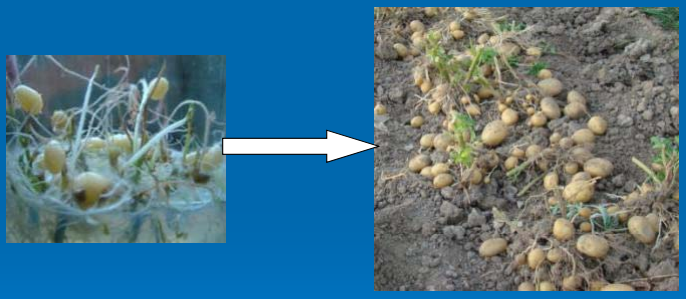
A new initiative on potato multiplication in Uzbekistan: a result of the collaboration between the Academy of Sciences and CIP



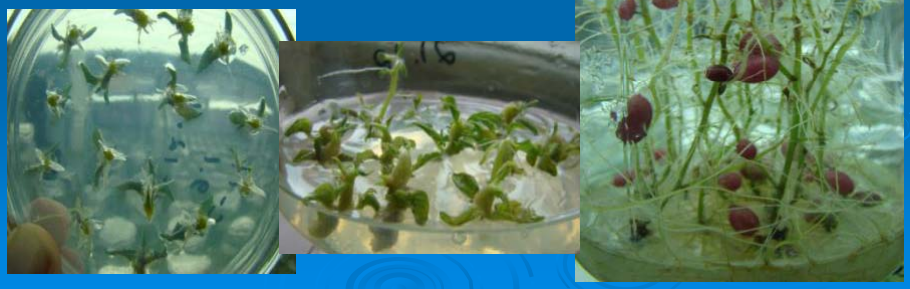
Timur Abdurakhmanov, Institute of Bioorganic Chemistry / National University of Uzbekistan
C. Carli, CIP-SWCA

15th SCM of CGIAR-CAC, Issyk-Kul, Sept. 2012

Background

- Before independence potato was not considered as a major agricultural crop in Uzbekistan. Mainly, both seed and commercial potato varieties were imported from Russia and other Soviet Republics. Therefore, potato production did not receive adequate attention.
- After independence, western seed companies entered the Uzbek market to such extent that nowadays 95% of the potato produced locally is of foreign origin with important implications in terms of hard currency export. Since potato is considered as the “second bread” by Uzbek people, it was a matter to ensure a self-sustainable food supply system by the local development of seed potato production on a cost – effective basis.

Although tissue culture activities on potato started in 1990, they became effective in 2005, further to close cooperation with CIP.



Potato in Uzbekistan: some facts

- Area under potato cultivation: 111 000 ha with regard to inter-seasonal planting. The cultivated area is planned to increase.
- In theory, the amount of seed potato needed is equivalent to 330 thousand tons/year.
- For full satisfaction of present demand it is necessary either to import or produce locally:
- Seed potato of Elite class 50-55.0 thousand tons,
- Seed potato of Super Elite class 7.0-9.0 thousand tons,
- Seed potato of Super Super Elite 1.1-1.5 thousand tons,
- Minitubers 250-300 tons (7.0 -7.5 mill. pcs.),
- Original material (in vitro plants/microtubers) 1.2 – 1.5 mill. pcs.

This presentation documents a collaboration between NARS of Uzbekistan and CIP that started in 2005 and is continuing up to now

Laboratory at the National Univ. of Uzbekistan

- The BioTech Laboratory, set up with CIP assistance, propagates disease-free *in-vitro* potato plants for experimental purposes and maintains the collection of CIP advanced clones.
- In the laboratory we can produce up to 100 000 *in-vitro* plantlets per year.

In the premises of the National University of Uzbekistan, we built with CIP's assistance three aphid-proof screenhouses (0.15 ha total) for in-vitro plants' adaptation and minituber production of CIP-bred potato clones for experimental purposes

Screenhouses at the National Univ. of Uzbekistan

A cultivation system for potato seed production of first field generation was tested with success at 2600 m altitude using potato minitubers produced in the aphid-proof screenhouses

Cultivation and harvest of CIP-bred clone (397077.16) in Akhangaran district, Tashkent province (2600 m asl)

Three advanced CIP-bred clones (Pskem- 390478.9; Sarnav-397077.16; Serkhosil- 397073.16) were released in Uzbekistan in 2010-2011 after selection conducted out of 80 CIP-bred clones. They combine adaptation to long day conditions, abiotic and biotic stress resistance, high dry matter and marketability

CIP 397073.16 - SERKHOSIL

Growing period, days - 110
Mean tuber weight, g - 80-100
Tuber shape - Oval
Tuber skin - Cream
Tuber flesh – light cream
Yield, t/ha - 30-35

CIP 390478.9 - PSKEM

Growing period, days - 90
Mean tuber weight, g - 90-100
Tuber shape - Round-flattened
Tuber skin - Cream
Tuber flesh - White
Yield, t/ha - 25-30

CIP 397077.16 - SARNAV

Growing period, days - 105
Mean tuber weight, g - 80-90
Tuber shape - Prolonged
Tuber skin - Cream
Tuber flesh - Yellow
Yield, t/ha - 35-40

An original potato micro-multiplication technique was developed and it has now obtained a registered patent (№ IAP 20100388).

Further to the success achieved in the potato research activities, the Government of Uzbekistan decided to allocate funds to ensure:

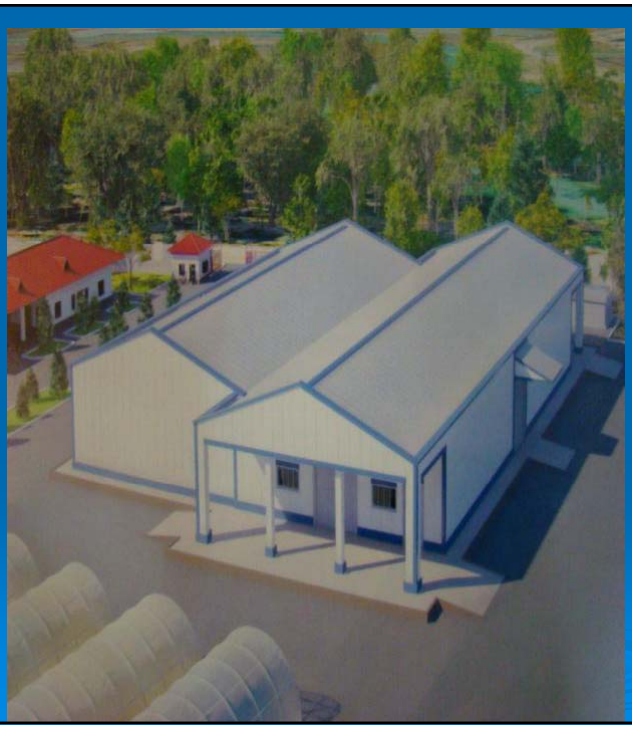
- Expansion of the laboratory for the yearly production of 1.5 million in-vitro plants and potato microtubers, disease-free.
- Construction of a complex including 1.5 hectares of screenhouses for minituber production, storage of seed potatoes, virus detection, administration, etc.
- Allocation of a total area of 200 hectares in the highlands, at an altitude of not less than 1,800 m asl, that will be used for experimental purposes and production of high quality seed up to elite category (E).

Laboratory for the production of disease-free *in-vitro* materials




The laboratory in the premises of the Bioorganic Chemistry Institute of the Academy of Sciences is planned to produce 1.5 million disease-free in-vitro plants and potato microtubers every year.

Map for the construction of the screenhouse complex of 1.5 hectares for minituber production in Kibray district, Tashkent region



Map for the construction of the storage infrastructure for seed potatoes (1500 tons)

Experimental, isolated fields in the highlands at an altitude of not less than 1,800 m asl

Future Plans

From 2014, plans are for the annual production of:

- **1.5 mill. pcs. of disease-free *in-vitro* potato plants and minitubers;**
- **1000 tons of seed potato cat. Super Super Elite, as a result of first field reproduction;**
- **5000 tons of seed potato cat. SuperElite, as a result of second field reproduction;**
- **25000 tons of seed potato cat. Elite.**

Main constraints that the program may face and likely solutions

- In the laboratory: mechanical transmission of viruses and viroids (PSTV); ➡ a staff has been intensively trained on disease detection and virus eradication at CIP-HQ in May 2012;
- In the screenhouses: regular renewal of soil to avoid soil-borne diseases (*Rhizoctonia sol., Phytium spp., Verticillium spp.*, etc.) and "volunteers", if cultivation in benches or beds is adopted. Another possibility is to introduce rotation with some crops (to be studied);
- In the field: spread of soil and seed-borne diseases if a rigorous crop rotation (not less than 3 years between successive potato crops) is not followed; and if a "**flash out**" system is not adopted (further categories of seed must not be planted in the fields where higher categories of seed are produced).
- Seed marketing: through the set up of demonstration trials in different regions of Uzbekistan, where Farmer Saved Seed (FSS) will be compared to foreign seed and seed of newly released varieties, and distribution of seed promotion packages (50 to 100 kg each), we plan to ensure decentralized seed diffusion at the farmer level.

THANK YOU FOR YOUR ATTENTION