



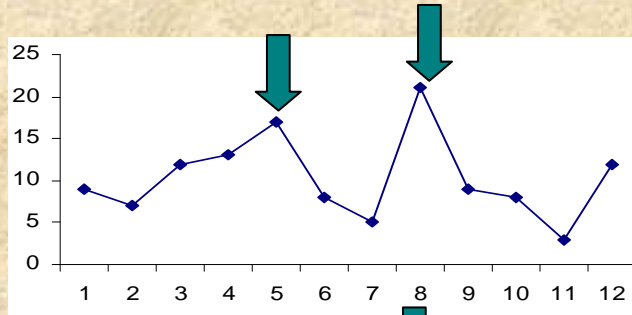
Gromozova E.N.,

Voychuk S.I., Kachur T.L.

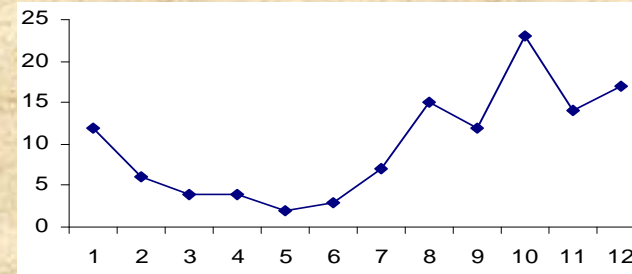
Search of factors causing reaction of metachromasy of volutin granules of yeast

Institute of Microbiology and Virology of NAS of Ukraine

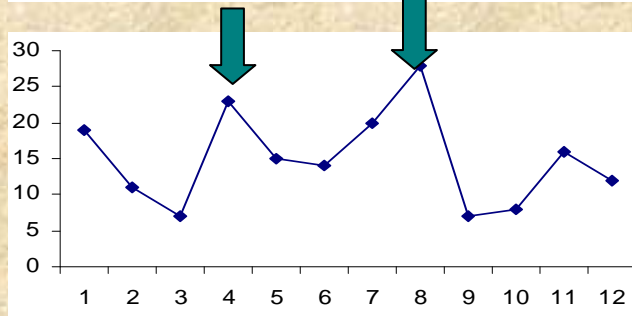
Seasonal variations of metachromasy



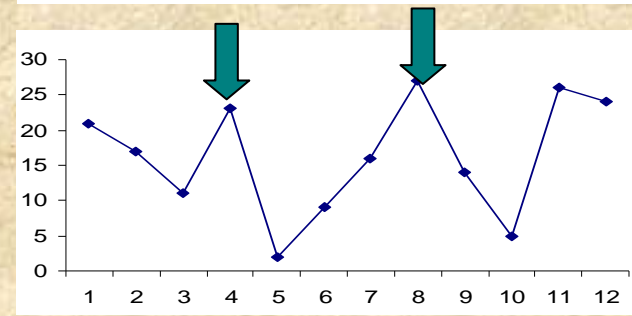
2002



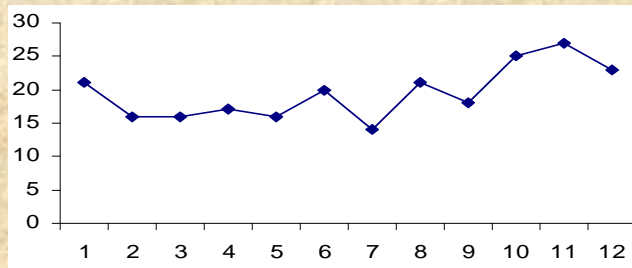
2006



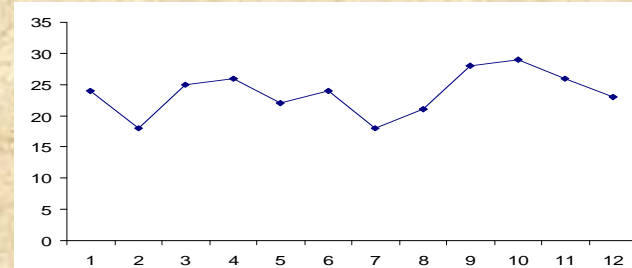
2003



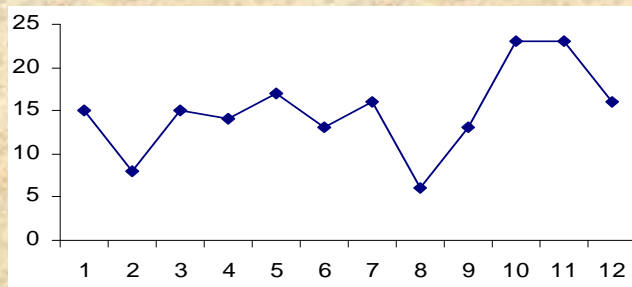
2007



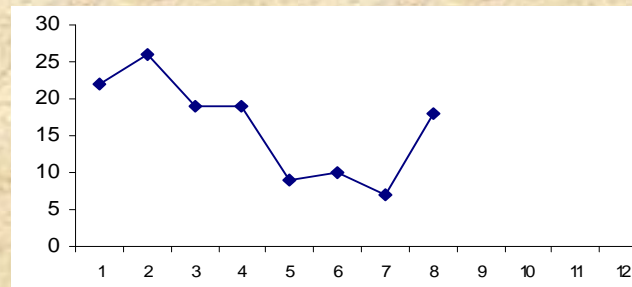
2004



2008

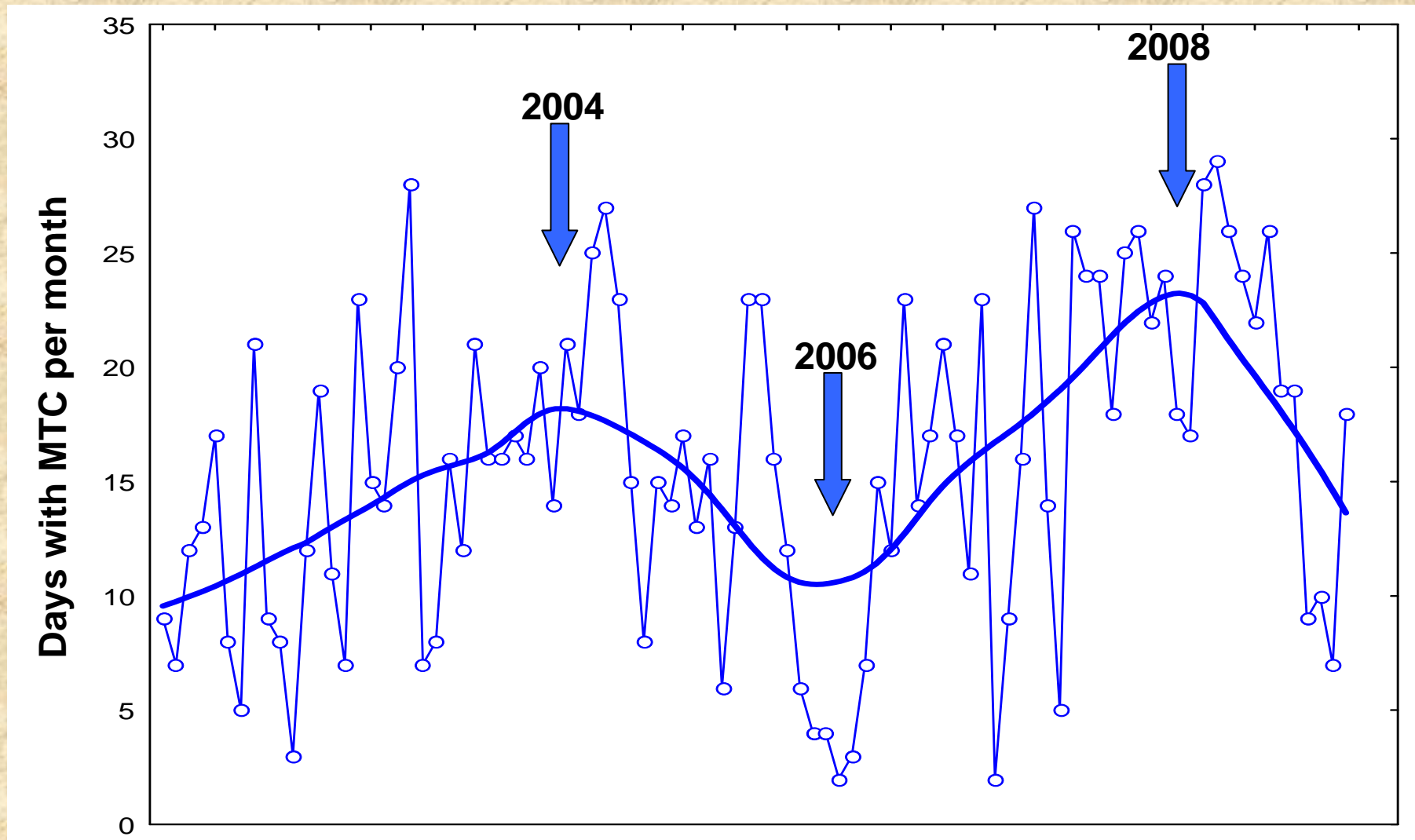


2005

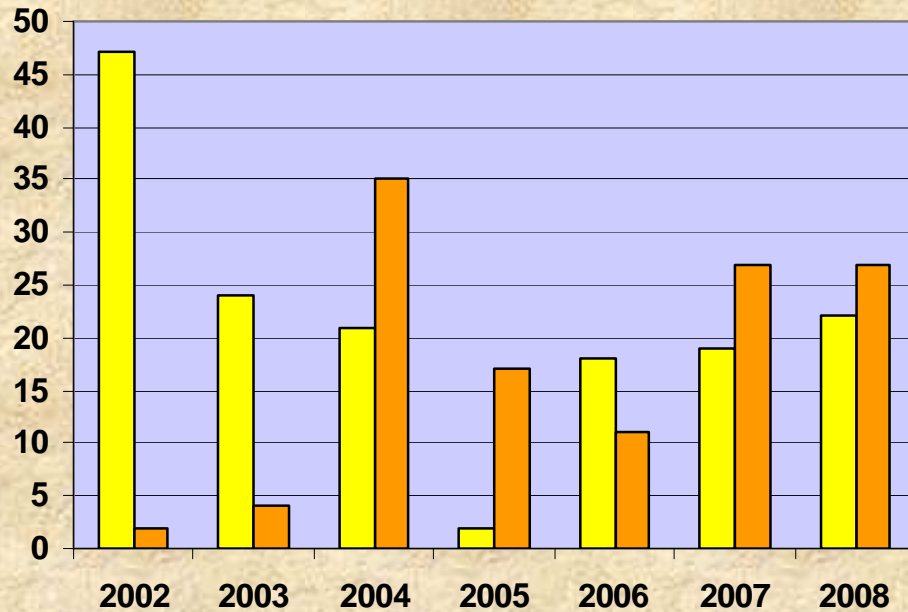


2009

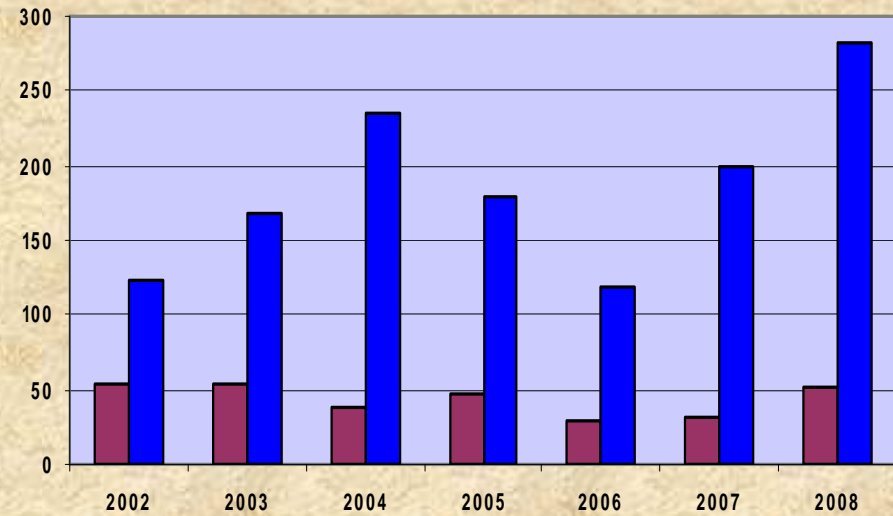
Periodicity of the MTC phenomenon (2002-2009 years)



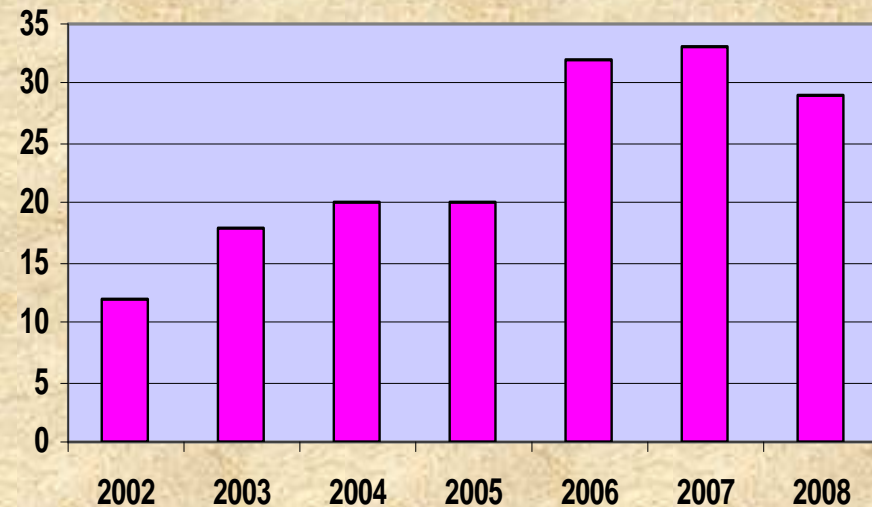
Peculiarities of metachromasy during 2002 – 2008 years



Quantity of one-day MTC (■) and over seven days MTC (■)

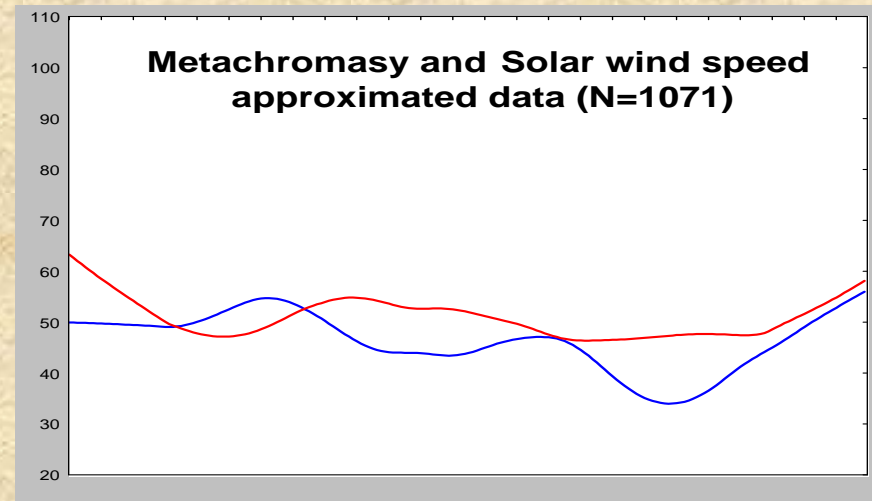
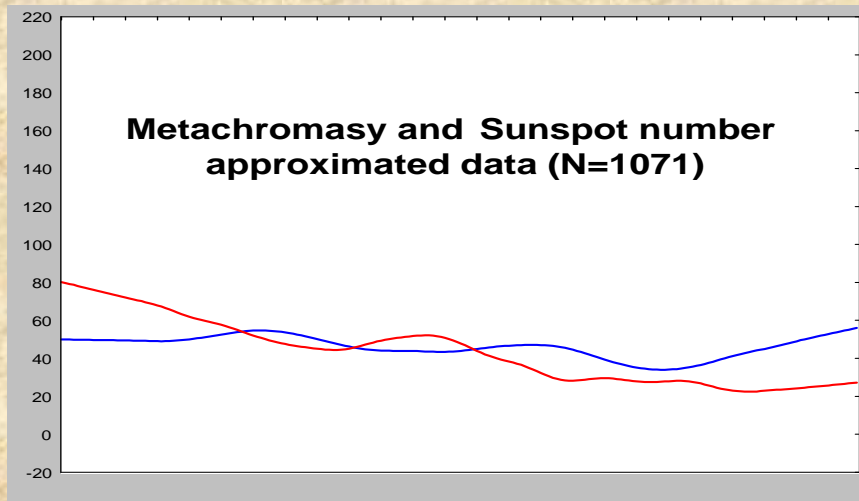
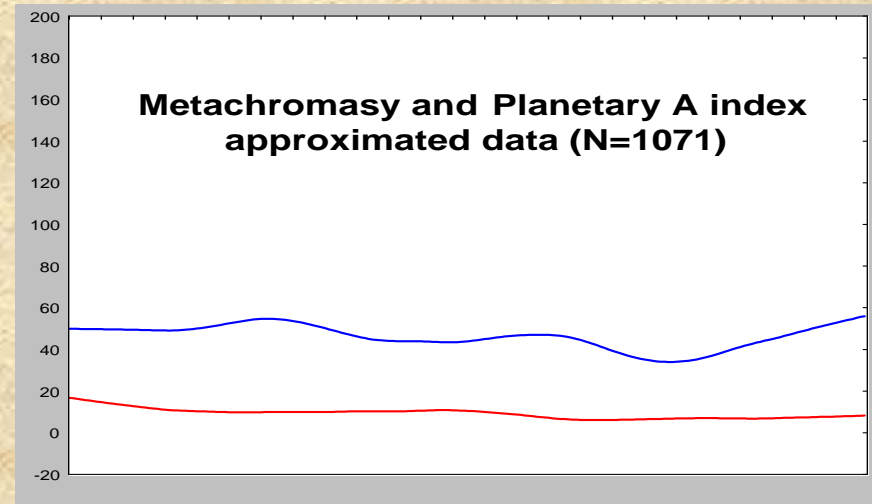
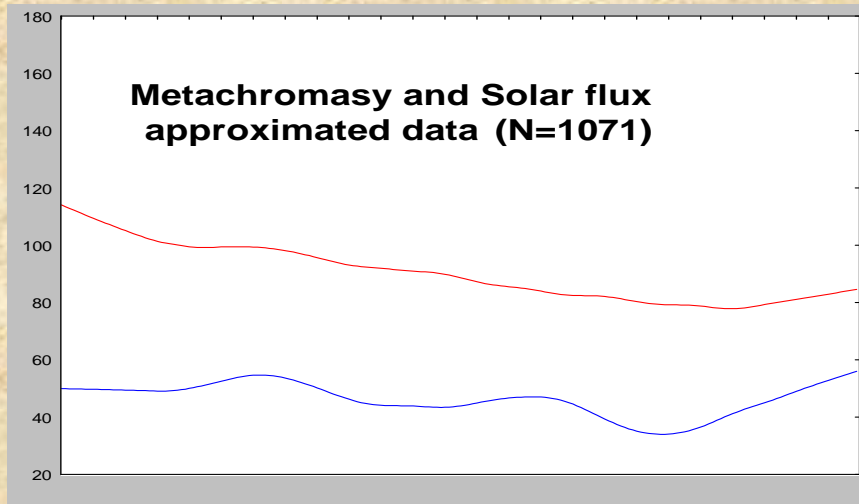


Quantity of MTC-knots (■) and days with MTC (■)



Max. duration of MTC-knots

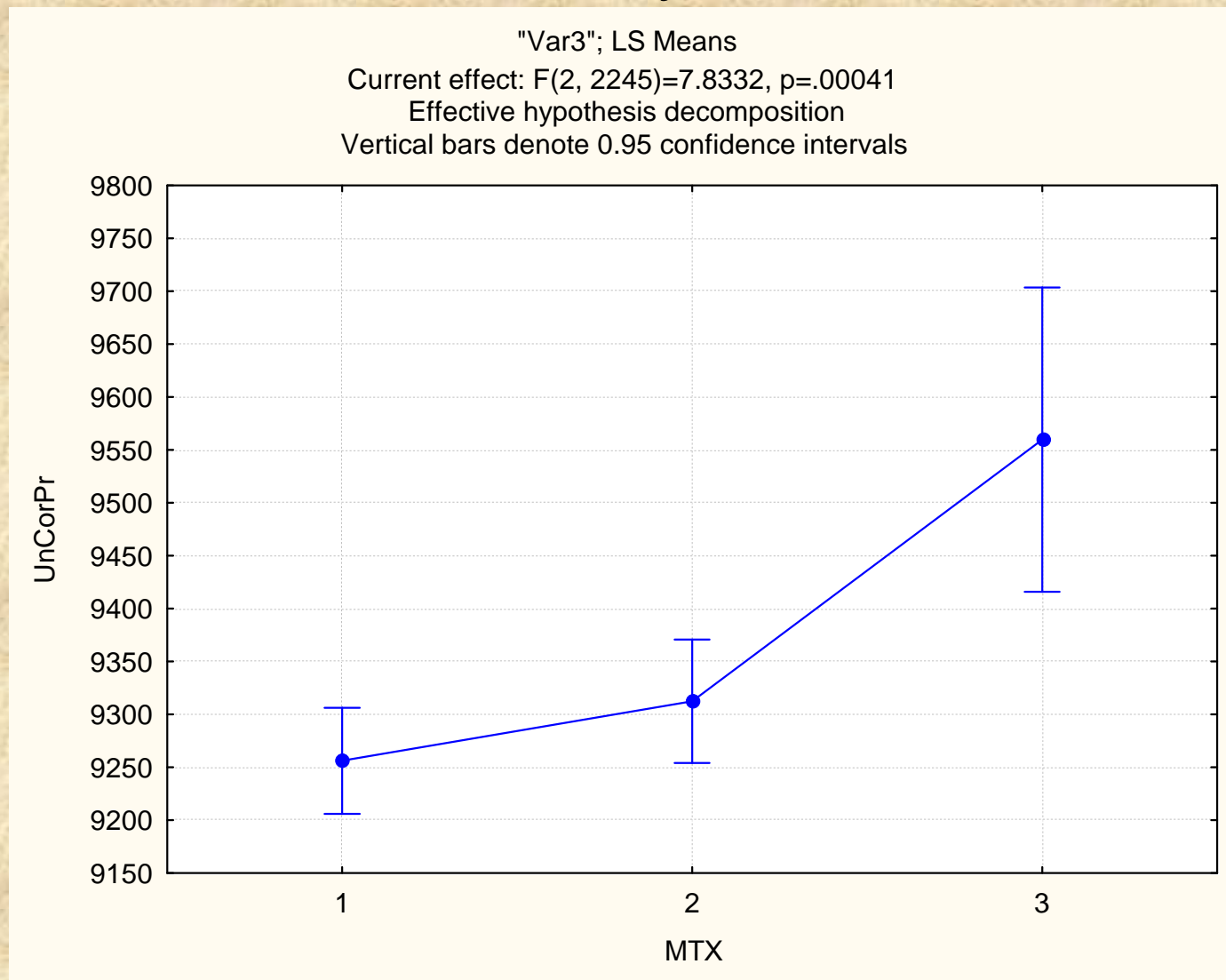
Change of MTC and different Solar-Terrestrial activity



 **MTC**

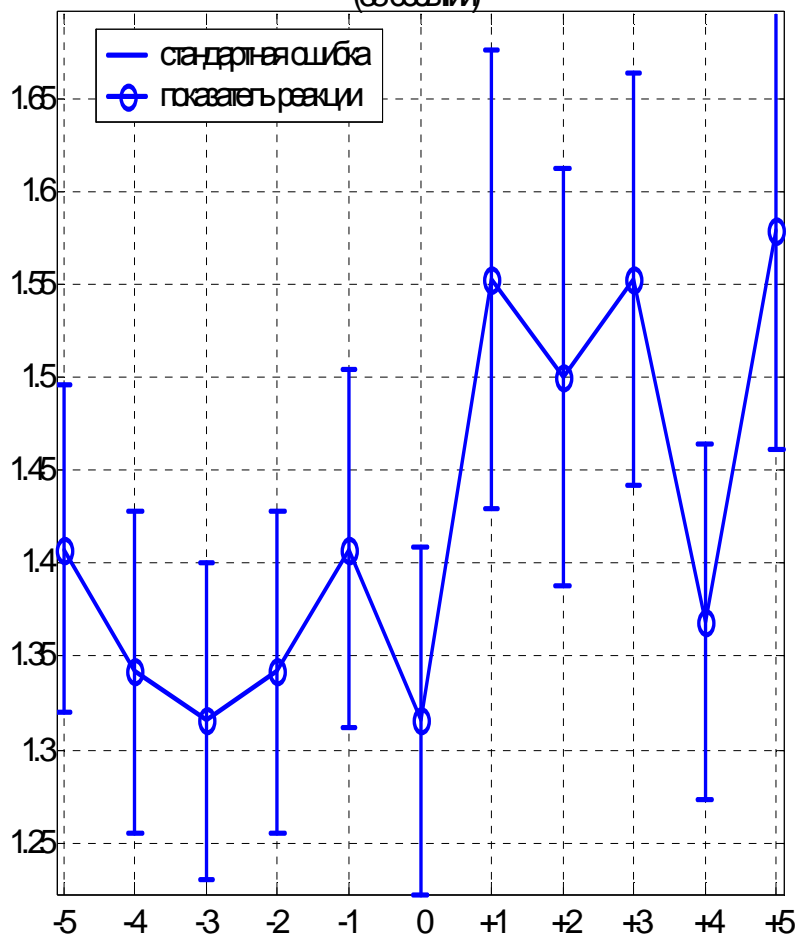
 **Solar-Terrestrial indexes**

Dispersion analysis of MTC data in connection to Cosmic rays index

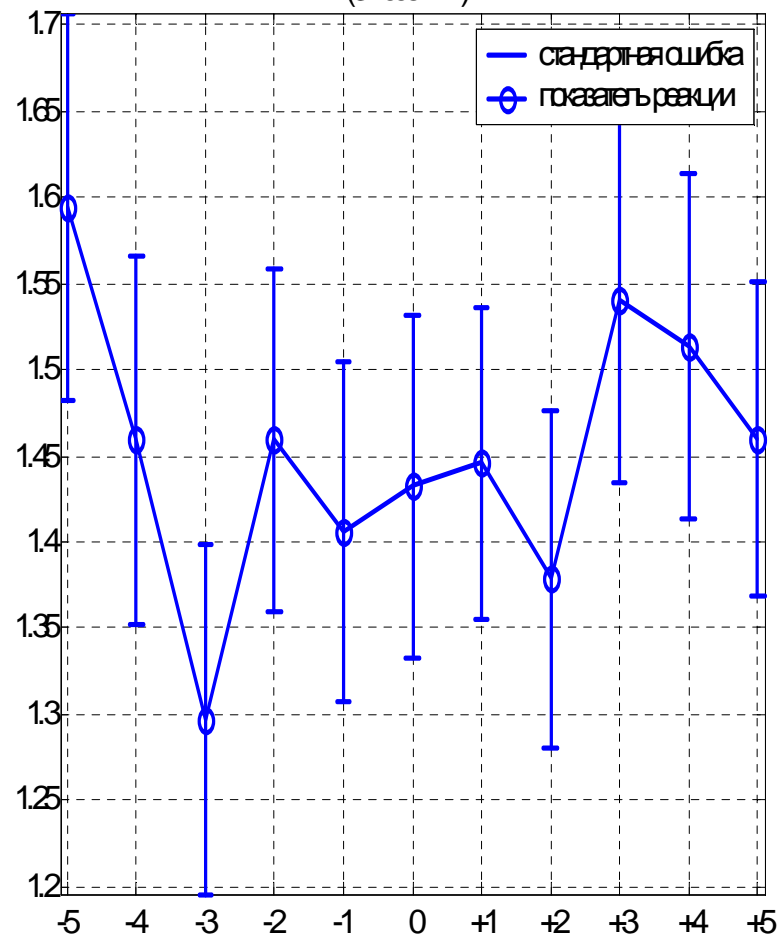


Dependence of MTC changes under Interplanetary Magnetic field sign

Показатель реакции Веллхера относительно даты события МПС "+" на "-"
(33 события)



Показатель реакции Веллхера относительно даты события МПС "-" на "+"
(37 события)

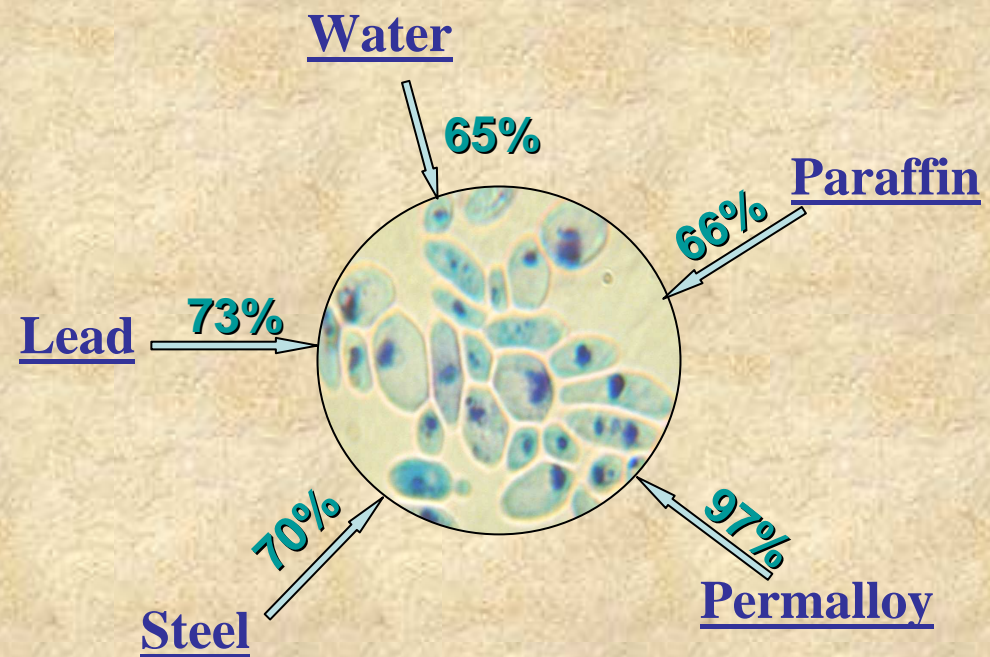


Effects of different shields on the metachromasy phenomenon

Correlation indexes of control sample with shielded samples

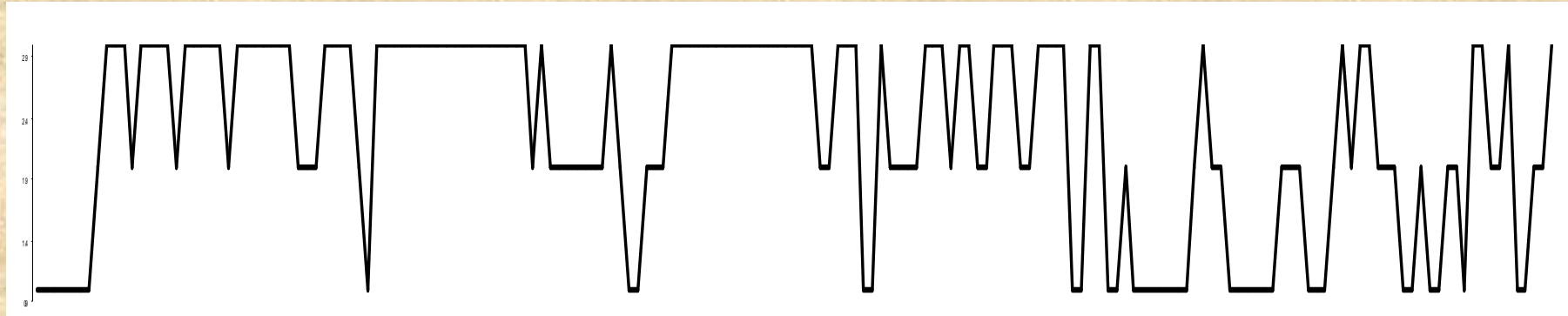
Shield	Control cells	Steel cylinder	Lead cylinder	Water bottle
Paraffin bottle	0.66 158*	0.69 156*	0.89 158*	0.76 92*
Permalloy	0.97 58*	0.83 58*	0.49 51*	
Water bottle	0.65 92*	0.65 92*	0.83 92*	
Lead cylinder	0.73 206*	0.75 204*		
Steel cylinder	0.70 243*			

* - number of measurements

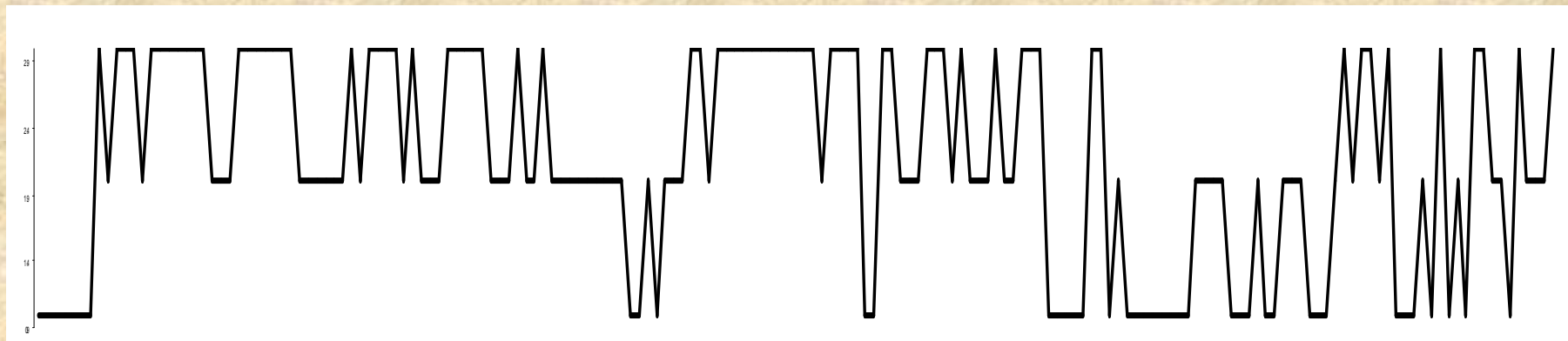


MTC of parent and mutant strains of *Saccharomyces cerevisiae*

***S. cerevisiae* CNX (parent strain)**



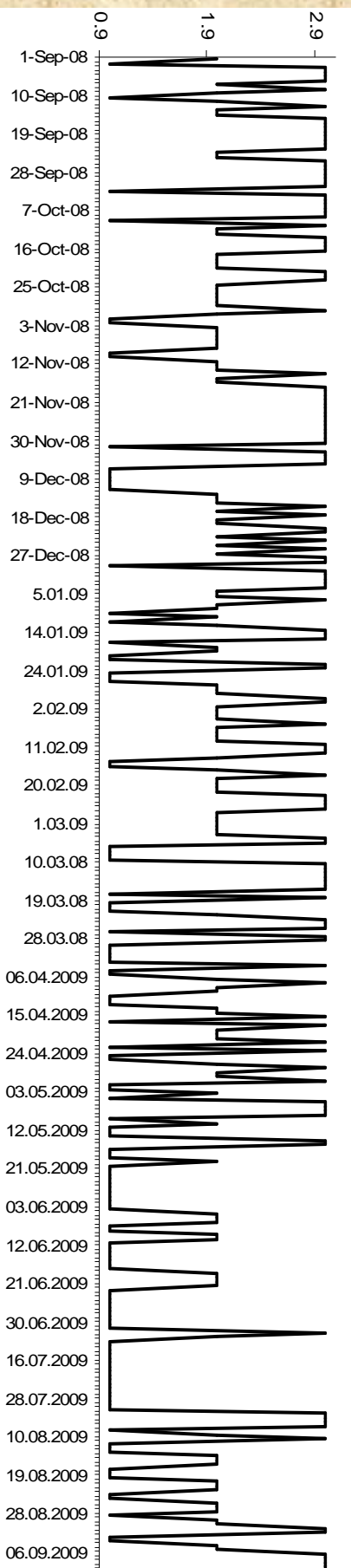
***S. cerevisiae* CRY (mutant)**



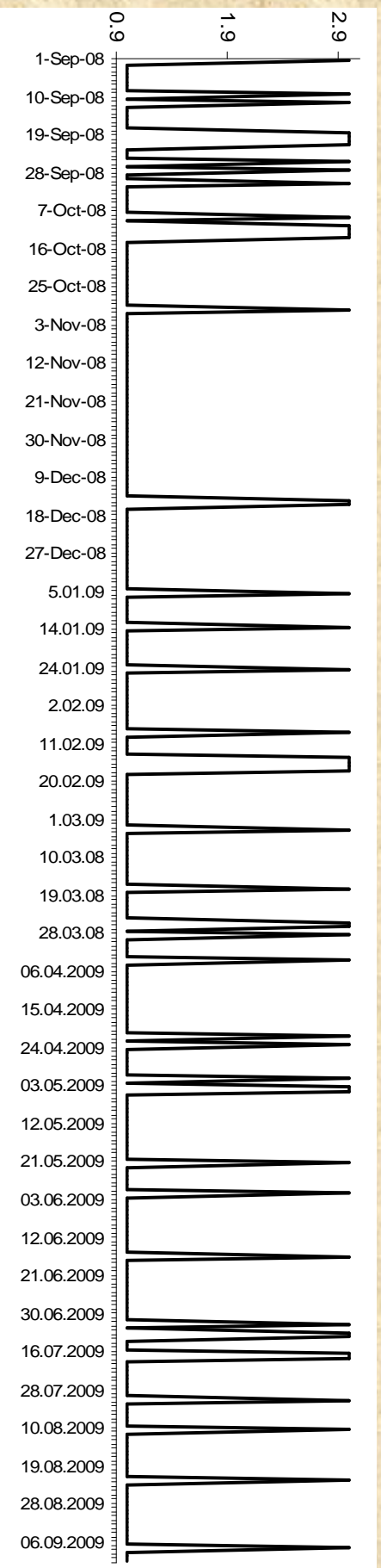
$R = 0.71$, $p < 0.05$, $N = 179$

Yeast and Bacterial Metachromasy

Saccharomyces cerevisiae Y-517



Rhodococcus arythropolis S741



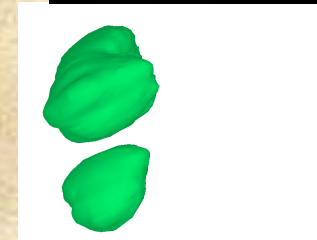
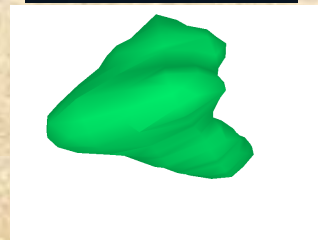
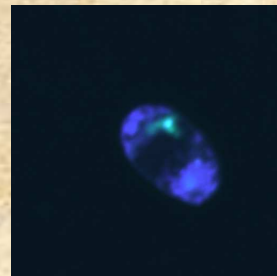
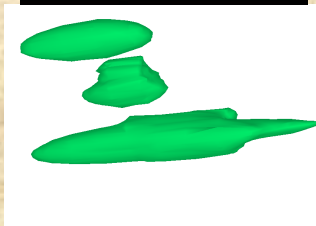
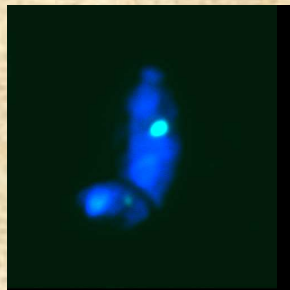
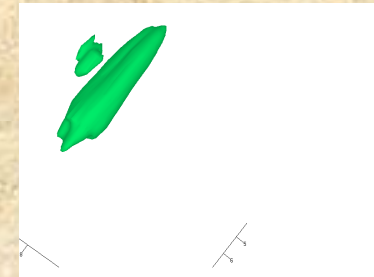
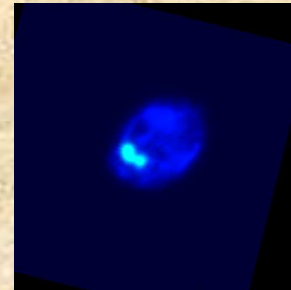
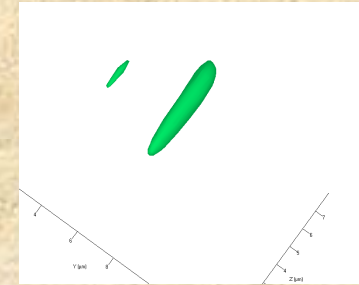
R = 0.06, p = 0.29, N = 356

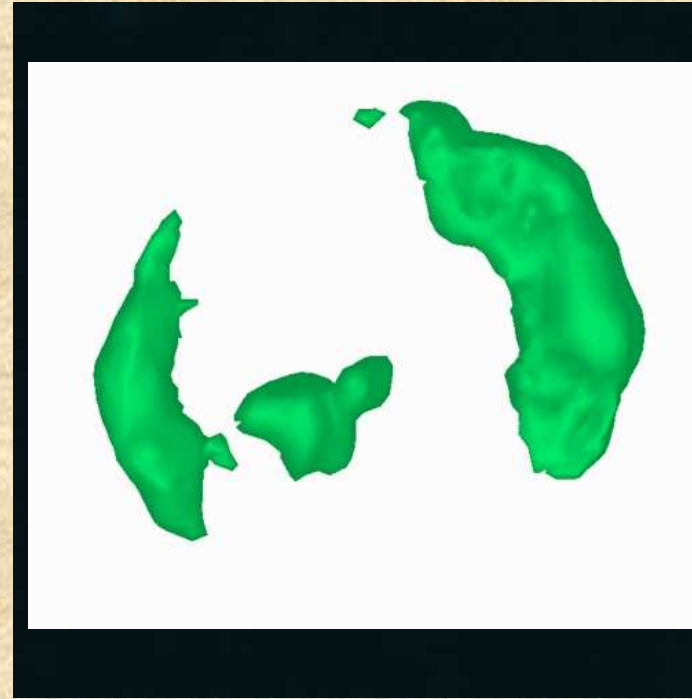
The general features of MTC and macroscopical fluctuations phenomena

- ✓ **Cosmo-physical conditionality**
- ✓ **Inverse relation with Solar activity (Wolf number)**
- ✓ **Disconnectedness with A-index**
- ✓ **Connected to the structure of Interplanetary Magnetic Field**
- ✓ **Possible connection with Galactic Cosmic Rays**
- ✓ **Independent of electromagnetic shielding**
- ✓ **Varied sensitivity of different objects to Cosmo-physical factors**
- ✓ **Visual method of estimation is more exact**

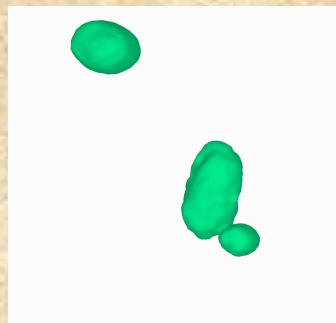
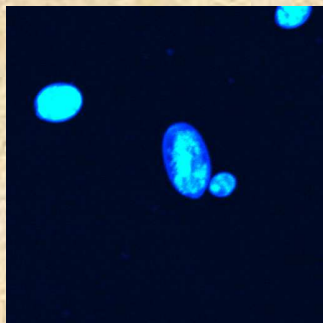
Volutine grains (dancing bodies) images by Confocal Microscopy

(LSM 510 META, Zeiss)

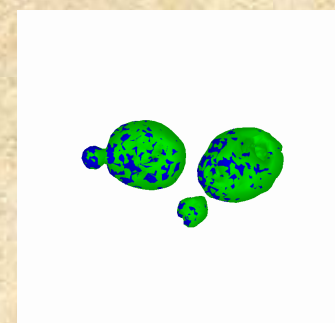




3D images of *Saccharomyces cerevisiae* intracellular polyphosphates



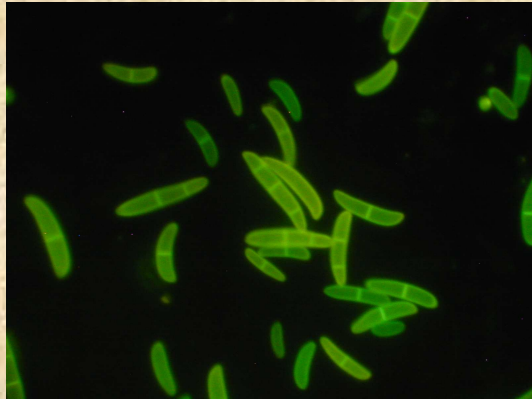
Phosphate (-) 24 hours



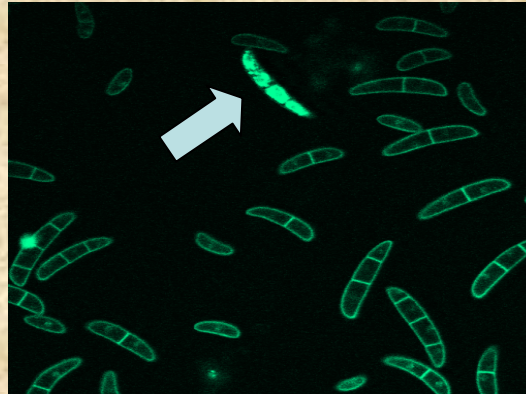
Phosphate (+) 24 hours

Volutine grains in conidia of *Fusarium solani*

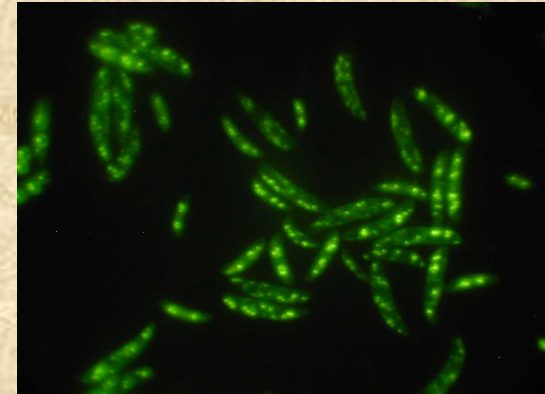
Initial sample



After 7 days



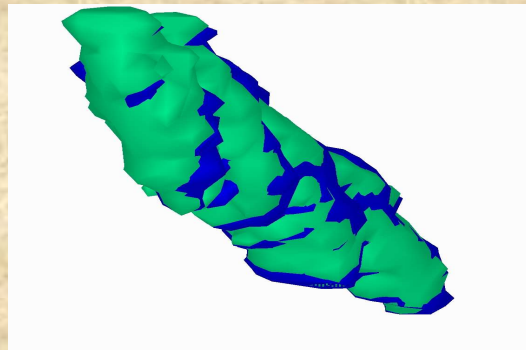
After 14 days



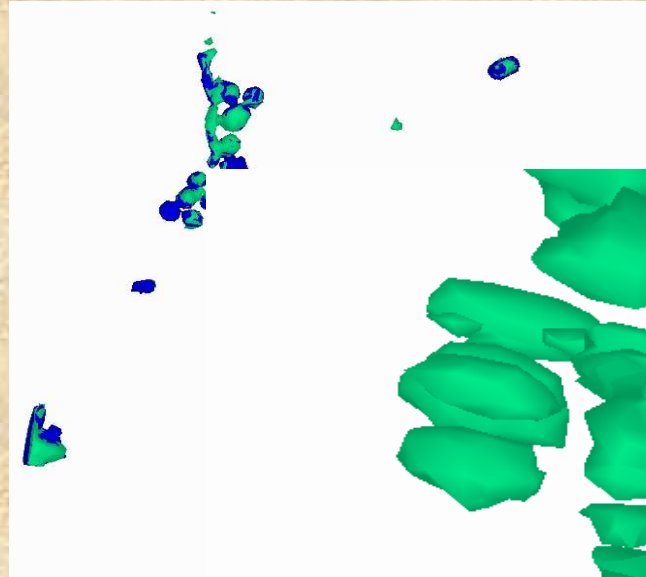
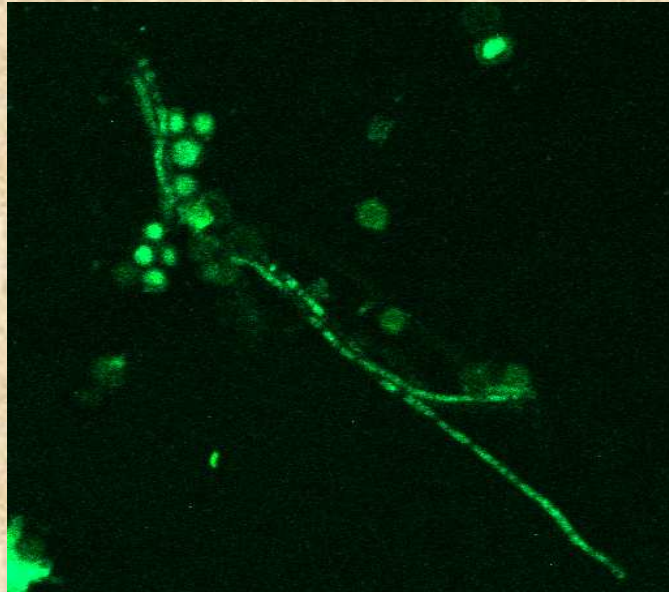
Initial samples have no visible grains;

After 7 days without nutrients some conidia (shown by arrow) included large regions of condensed material possibly polyphosphate;

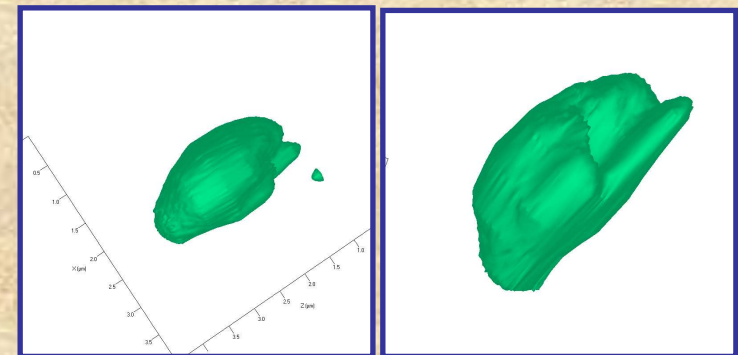
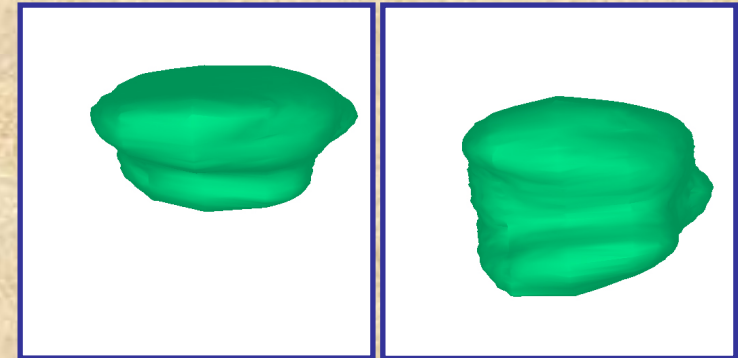
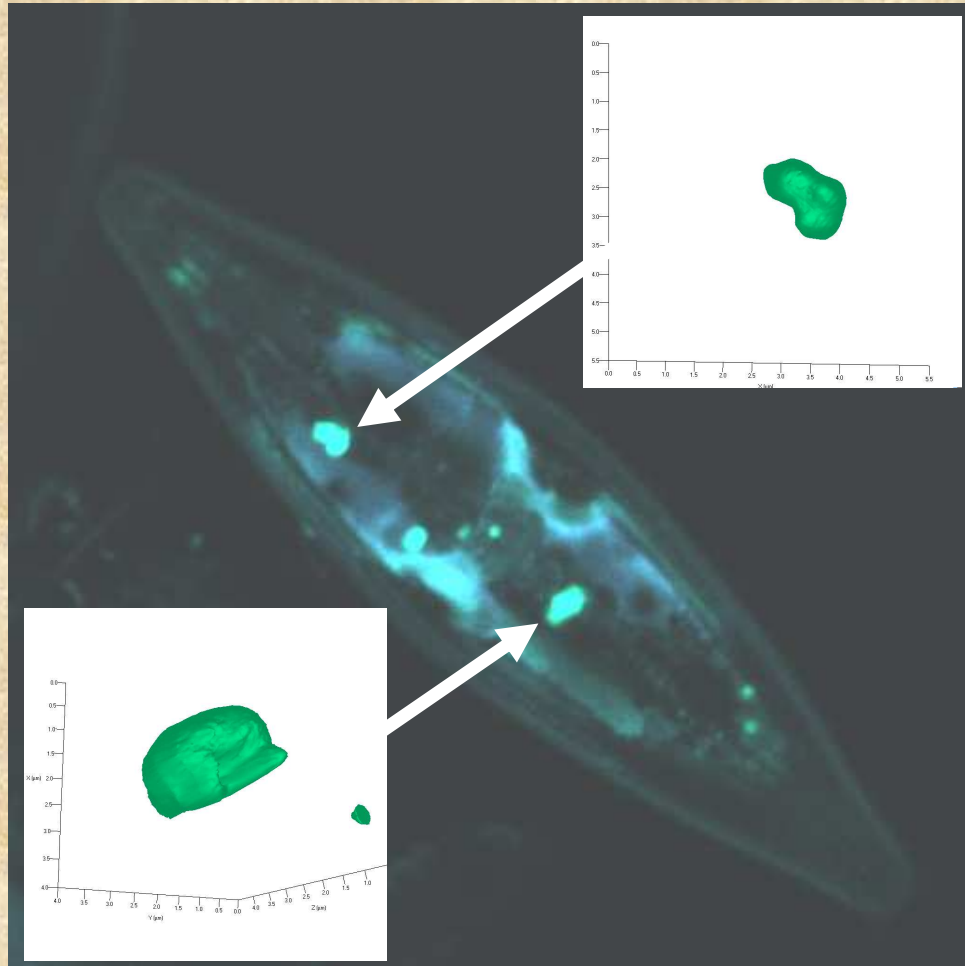
After 14 days the same conditions all conidia included grains similar to the yeast volutine grains.



Volutine grains in the hypha of *Fusarium solani*



Volutine grains in Bacillariophyta



Frustulia rhomboides

THANKS

To be continued ...