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# EFFECT OF CLIMATE CHANGE ON FOOD CHAIN SAFETY

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# INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE (IPCC, 2007)

- **The current climate change is „unequivocal" and is due largely to emissions of greenhouse gases resulting from human activity**

- **The effects of this climate change can now be detected on each continent („global warming", increased climate variability)**

**In HUNGARY**

- **VAHAVA (Change – Effect – Response) PROJECT**
- **Parliament: National Strategy on Climate Change**
- **HAS: Presidential Committee on Environmental Science (KÖTEB) and its subcommittees**
- **KÖTEB's subcommittee on Food Safety**

**EXPECTED CLIMATE CHANGE**
**IN THE KARPATHIAN BASIN FOR 2021-2040**
**(reference period: 1961-1990)**

- **the annual number of heatwave days (Tmed. >25 $^0$C) may increase by 20-70 %**
- **annual warming compared to the reference period: 1.1 $^0$C**

**(Bartholy et al., 2010)**

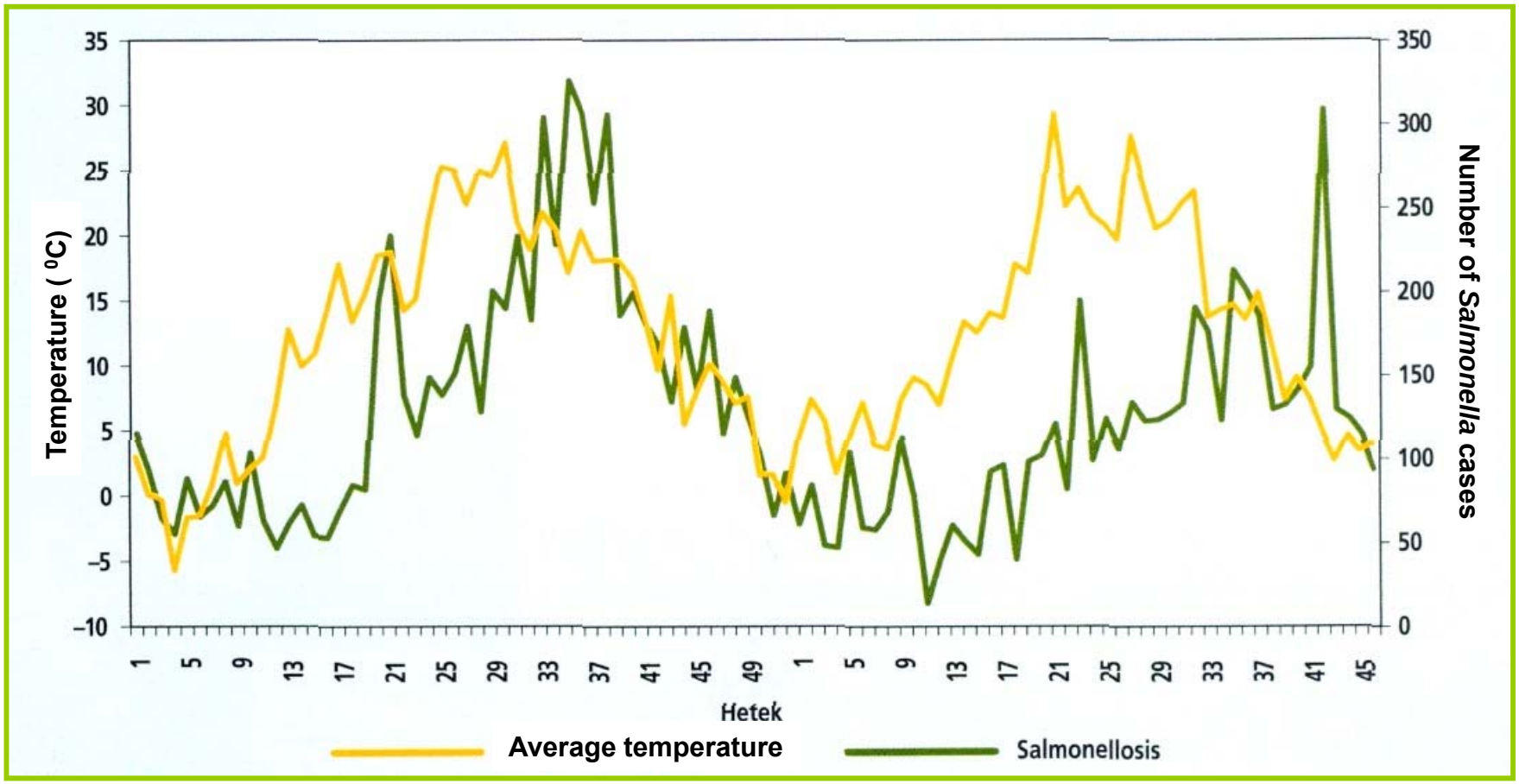
# POTENTIAL IMPACT OF WARMING CLIMATE AND INCREASED OCCURRENCE AND MEASURES OF WHEATHER EXTREMITIES ON FOOD SECURITY AND FOOD SAFETY

- new weeds and pests, increased damages of crops
- increased demand and use of pesticides and animal health remedies
- increased microbial and chemical contamination
- reduced storability of foods
- more vulnerable, more costly „cold chain”

→ IMPAIRED SAFETY OF FOOD SUPPLY CHAIN

# BACTERIOLOGICAL FOOD SAFETY

**Relationship between the (registered) number of *Salmonella* cases and the weekly average temperature in Hungary**



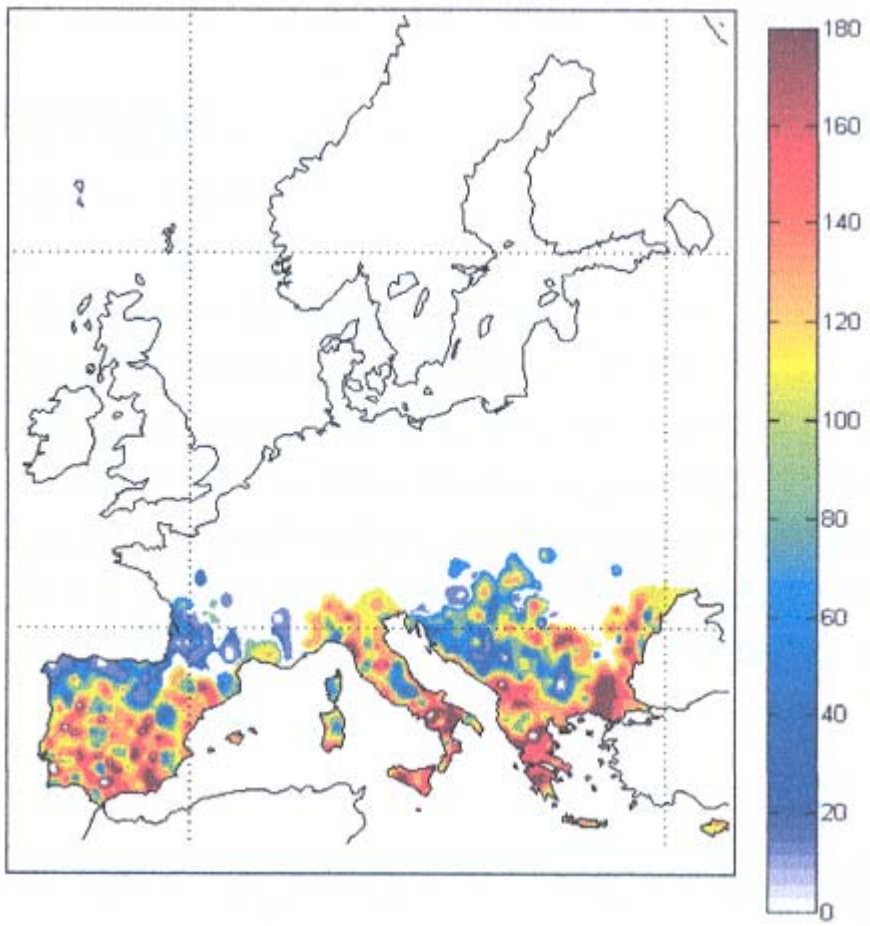

**(Harnos et al., 2008)**

# MYCOLOGICAL FOOD SAFETY

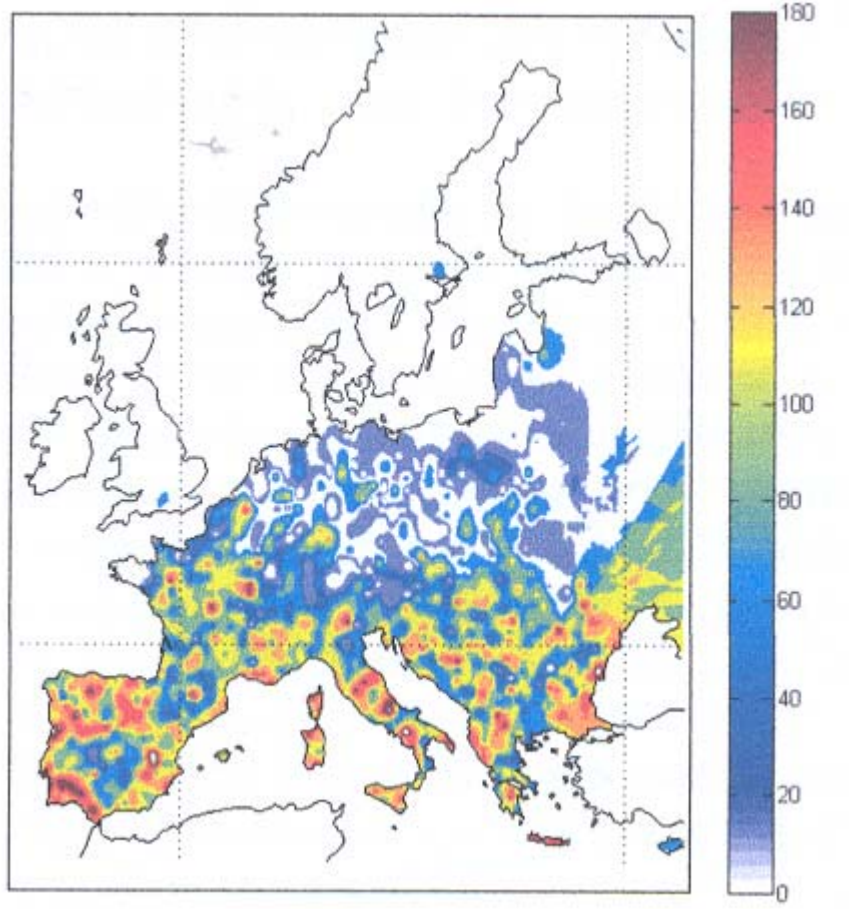
- **Increasing risk of mycotoxins due to increased growth of toxigenic moulds**
- **Low levels of mycotoxins cause chronic diseases only after long accumulation time**
- **Mouldiness and mycotoxin risks are not readily apparent in processed food**

**Battilani et al.: Modelling, predicting and mapping the emergence of aflatoxins in cereals in the EU due to climate change. Scientific report submitted to EFSA, 2012.**

# Maps of risk index values for aflatoxin $B_1$ contamination of maize




+2 $^0$C




+5 $^0$C

temperature increase

# MYCOLOGICAL FOOD SAFETY

- **Toxigenic moulds of *Penicillium* and *Fusarium* genera adapted to temperate climate are already risk factors**

- **Due to the expected climte shift, occurrence of thermophylic toxigenic *Aspergillus* species shall become also more frequent**

# TASKS/PROPOSALS FOR MITIGATION OF RISKS AND ADAPTATION TO CLIMATE CHANGE

- **Establishing/using „good practices” and HACCP from „farm to fork”**
- **Breading plants for better resistance to climatic stresses**
- **Continuous of risk assessment/modelling**
- **Risk communication, education and training**
- **Interdisciplinary cooperation/research**

# Publications of the present authors on the effect of climate change on the safety of food chain


**Farkas J., Beczner J. (2009): A klímaváltozás és a globális felmelegedés várható hatása a mikológiai élelmiszer-biztonságra. „*KLÍMA-21" Füzetek,* No. 56, 3-17.**

**Farkas J., Salgó A. (2009): Az élelmiszerbiztonság analitikai kérdései, különös tekintettel a klímaváltozásra. *Magyar Kémiai Folyóirat, 115* (1), 10-13.**

**Farkas J., Beczner J. (2010): A klímaváltozás lehetséges hatásai az élelmiszer-biztonságra. *Élelmiszervizsgálati Közlemények, 56*, 219-230.**

**Csernus O., Andrássy É., Bata-Vidács I., Beczner J., Farkas J.: (2011): *Penicillium expansum* és *Aspergillus niger* növekedési hőmérséklet- és vízaktivitás-függésének vizsgálata, különös tekintettel a klímaváltozásra. *Élelmiszervizsgálati Közlemények, 57*, 209-218.**

**Farkas J., Beczner J., Szeitzné Szabó M., Kovács M., Varga J., Varga L. (2012): A Kárpát-medence éghajlat változásának kihatása élelmiszerbiztonságunkra. Magyar Tudomány (közlés alatt)**