Biofumigation 7
plants for soil health
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Biofumigation experiences in Argentina

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Horticultural crops in Argentina are produced along a wide territory under very different climatic conditions.

Biofumigation has been assayed mostly under protected cultivation where intensive use of soil originates high populations of nematodes and soil borne pathogens.

These practices have been successful, allowing the disinfection of soils in a sustainable manner and the improvement of their physical, chemical and biological properties. This technique has proved to be more effective when combined with solarization (Biosolarization).



Coronda: biofumigation with sorghum leafs for strawberry soil borne diseases control (Sordo, 2019).

Mendoza: continental weather, summer is hot. Control of strawberry diseases as *Phytophthora, Rhizoctonia, Pythium, Verticillium, Macrophomina*, and nematodes as *Meloidogyne, Ditylenchus* has been achieved using rapeseed as fumigant in the greenhouse (Gabriel, 2014).

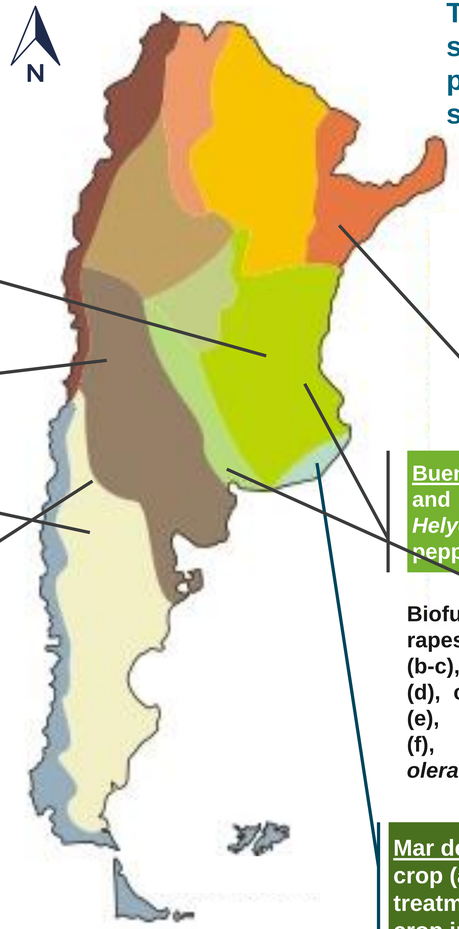
Rio Negro: weed control using cabbage in spring for open field tomato crops. In the same province, *Fusarium oxysporum* in onion was controlled using cabbage in autumn and summer (Bustamante *et al*., 2008).




Neuquén: semiarid region with hot summers but very cold winters. Weed control in onion open field nurseries using chicken manure and cabbage in summer (Vasquez, 2013).

"In vitro" control of *Fusarium oxysporum* with *Brassica oleracea* var. capitata (Arias *et al*., 2015).


"In vitro" control of *weeds* with *Brassica oleracea* var. capitata (Bustamente *et al*., 2015).

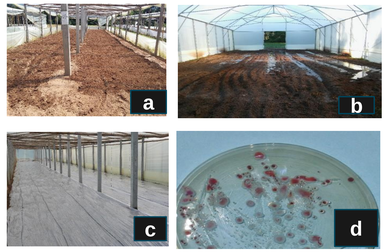


Climate zones of Argentina

- Subtropical with no dry season
- Subtropical with dry season
- Tropical highland
- Temperate and humid Pampean
- Temperate and semi-arid Pampean
- Temperate Oceanic
- Temperate highland
- Arid climate of hills and fields
- Semi-arid climate
- Patagonian cold arid
- Arid climate in Puna
- Cold and humid
- Cold Polar

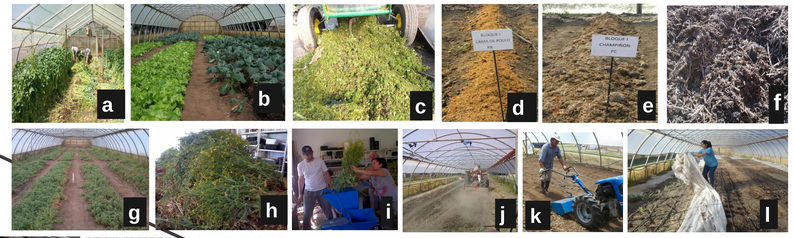
Corrientes: Chicken and cattle manure into the greenhouse soil prior to solarization was effective against *Ralstonia solanacearum*, *Pythium aphanidermatum*, *Rhizoctonia solani* and *Sclerotium rolfsii*. Other biofumigants:pine tree fallen leaves, grass, cabbage and sorghum (Obregón, 2019).

Chicken manure distribution (a), irrigation (b), biosolarization treatment (c), and *Ralstonia solanacearum* colonies (d)



Buenos Aires: Biosolarization was effective controlling *Pyrenochaeta lycopersici*, *Fusarium solani*, *Sclerotium rolfsii* and *Sclerotinia sclerotiorum*, weeds and damping off pathogens, as well as nematodes like *Nacobbus aberrans*, *Helycotylenchus* and *Criconemella*. The amendments used were chicken manure, broccoli, sorghum, tomato and pepper crop debris, mustard, weeds, rapeseed and *Brassica campestris* (Mitidieri *et al*., 2019; Cuellas *et al.* , 2019).

Biofumigants: *Brassica campestris* rapeseed (a), brocoli (b-c), chicken manure (d), champignon bed (e), tomato residue (f), *Portulaca oleracea* (g) , incorporation of organic matter (j-k), taking off the plastic after treatment (l).



Mar del Plata: Broccoli crop (a), biosolarization treatment (b) . Lettuce crop in control (c) and treated plot (d) (Adlercreutz, 2019).

In **Bahía Blanca**, a city with a colder weather *Meloidogyne hapla* was controlled using cattle manure and cauliflower in spring and summer in the greenhouse. Nematodes of the same genus were controlled in winter using *Melia azedarach* seeds as fumigant. (Rodriguez *et al*., 2010 , 2014)

Mitidieri et al, 2016. Biofumigation experiences in Argentina. https://www.harper-adams.ac.uk/research/cipm/page.cfm?id=2