

Alternatives to MeBr in Strawberry Crops

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ANTECEDENTS

The restrictions and later phase out of MeBr approved in Montreal Protocol, led Dow AgroSciences -in cooperation with other companies- to support the development of the mixtures 1,3-Dichloropropene + chloropicrin as an alternative for agricultural soil disinfection.

From that date, trials-demonstrations in Strawberry crop in Huelva Province (Spain) were planned.



TRIALS-DEMONSTRATIONS PROGRAMME

To carry out the programme a very active role was played by AGROQUIMICOS DE LEVANTE, the first company dealing with soil treatments and MeBr distribution, with broad experience and know-how also in the strawberry cropping area.

AGROQUIMICOS DE LEVANTE is also owner of several formulations based on this mixture, sold with the AGROCELHONE trademark, products that were used to carry out the above mentioned trials.



OBJECTIVES

- Comparative Trials: efficacy of 1,3-D/Pic in comparison with:

MeBr 67/33 and 50/50

Metam-Na

Metam-K

- Assessing the % control of:

nematods: *Meloidogyne sp.*, *Pratylenchus penetrans*

soil fungus: *Phytophthora spp.*, *Verticillium dahliae*,
Rhizoctonia sp., *Fusarium sp.*, *Phytium sp.*

Effect on production / yielding



LOCATION OF TRIALS

Situation in function of several microclimes and kind of soils:

Lepe (S.C.A. Nuestra Sra. La Bella) during the years 98-99, 99-00, 00-01

Cartaya (Coop. Agr. Hort. de Cartaya) during the years 99-00, 00-01

Moguer (Pino de la Corona, S.C.A.) during the years 98-99, 99-00, 00-01

Lucena (S.C.A. Costa de Huelva) during the years 98-99, 99-00, 00-01

Rociana (S.A.T. Condado de Huelva) during the years 99-00, 00-01

La Redondela (Alfonseca) during the years 99-00

Palos de la Frontera (CORA) during the years 99-00, 00-01



METHODS OF APPLICATION AND RATES

- All surface:

MeBr 67/33	400 kg/Ha
50/50	400 kg/Ha
AGROCELHONE N	400 kg/Ha
Metam-Na	1000 kg/Ha
Metam-K	1000 kg/Ha

- Soil-Bed Injection:

MeBr 67/33	200 kg/Ha
50/50	200 kg/Ha
AGROCELHONE N	200 kg/Ha



PROPERTIES OF AGROCELHONE N

- Composition of AGROCELHONE N: 61.1% 1,3-Dichloropropene + 34.7% Chloropicrin
- Liquid fumigant
- Act against nematods and soil fungus, and it has action on weeds in germination.
- It's applied in the soil before sowing or planting.
- It's classified as Very Toxic (T+) as MeBr.
- Less dangerous for the technicians that apply the product due to 2 main reasons:
 - it's liquid and not gas
 - it's not required big pressures
- It's degraded in the soil, avoiding problems of residues in the fruits.
- If the safety period is kept, the risk of phytotoxicity for the plants or seeds it will disappear.





All terrain Treatment:

It's applied with injection machines, the product is injected under the soil, through pressure, the machine seals the soil with transparent PE film. The machine is hooked behind tractor. The application is done alternating bands, doing after 10-15 days the second part of the disinfection





Bed Treatment:

It's applied with a injection machines, the injection is localized in the line of plantation (bed). The machine is hooked behind the tractor and does the bed, inject the product, seal the soil with black PE film and put the irrigation lines at the same time.

CONTROLS

Production:

Quality: 1^a Category and 2^a Category

Yielding: gr/plant

Phytopsanitary State:

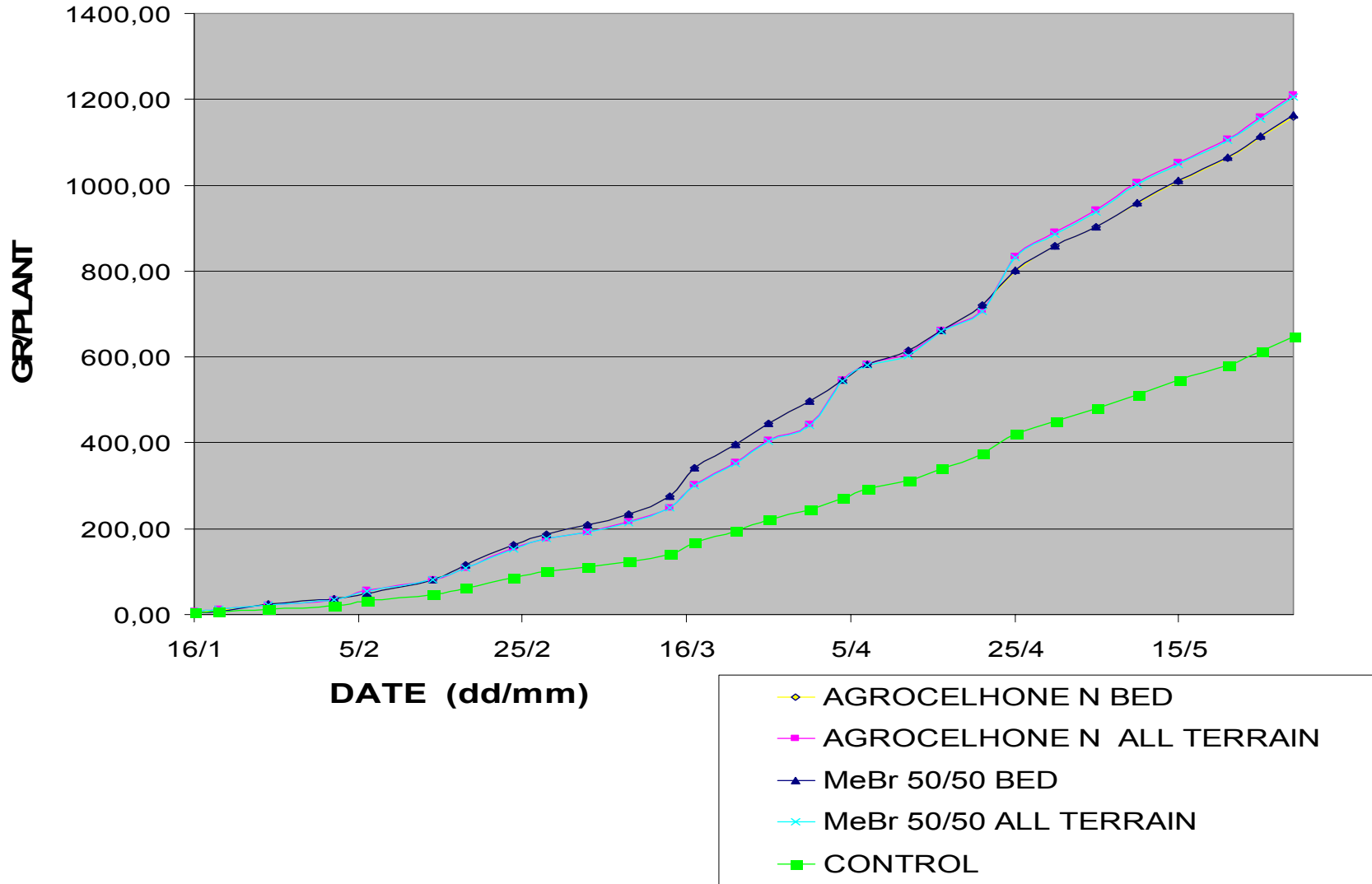
Incidences of pests and diseases

Development of root system



TRIAL on 1999-2000: Rociana del Condado

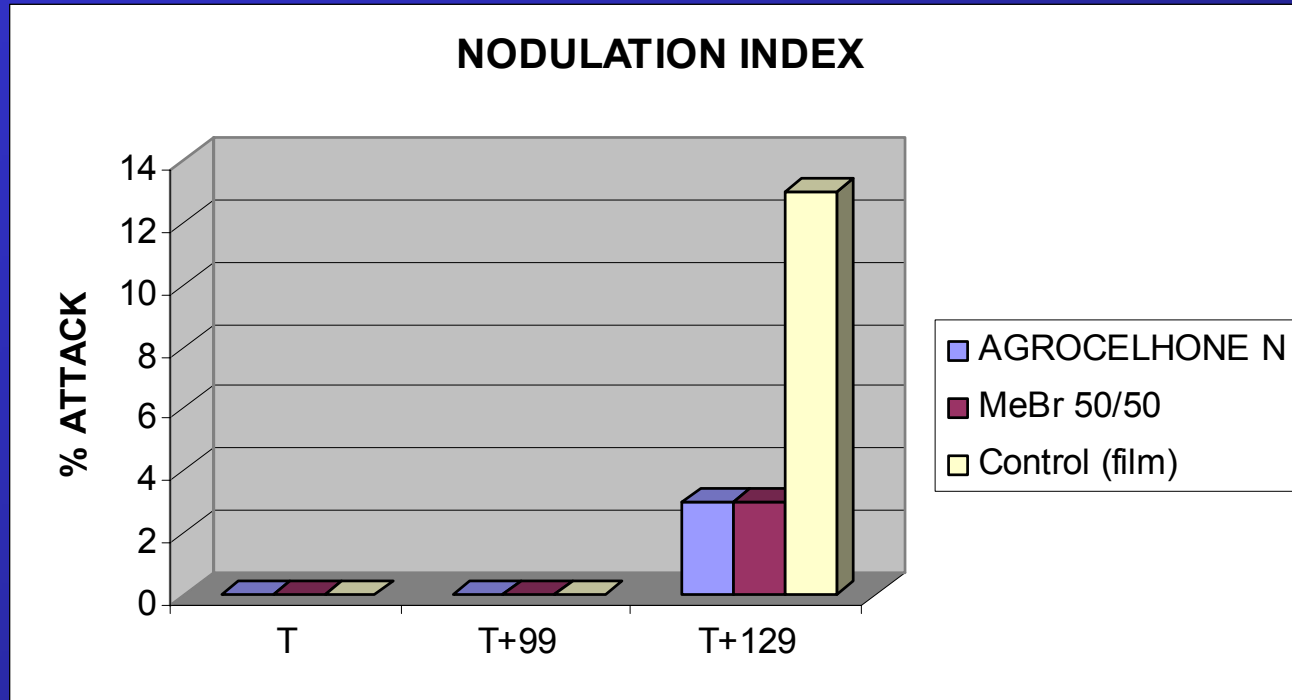
PRODUCTION: GR/PLANT cumulative



Phytosanitary State:

Rociana del Condado, Finca Moriana - var. Camarosa.

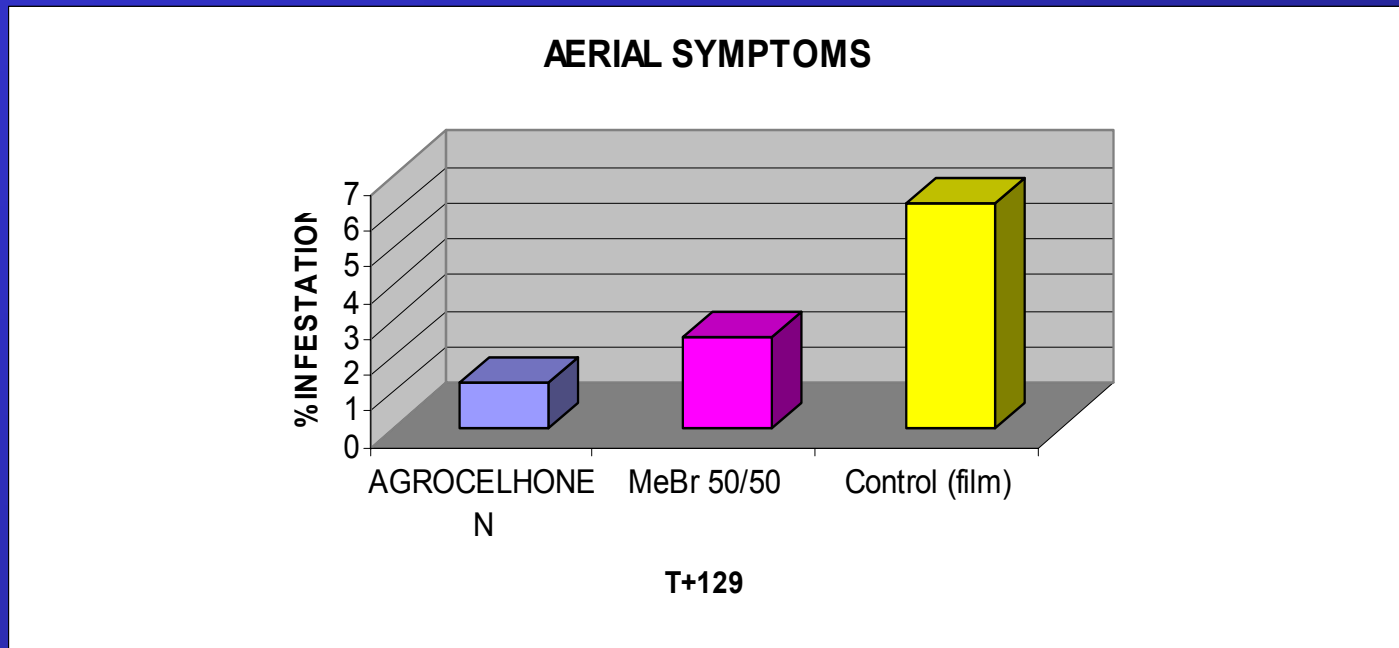
Nematods: *Meloidogyne sp*, *Pratylenchus Penetrans*



	T	T+99	T+129
AGROCELHONE N	0	0	3
MeBr 50/50	0	0	3
Control (film)	0	0	13



Fungus: *Phytophthora*, *fusarium*, *pythium*, *rhizoctonia*



	T+129
AGROCELHONE N	1,25
MeBr 50/50	2,5
Control (film)	6,25



USING PRECAUTIONS

- The application of AGROCELHONE N is restricted only to operator holding the license specifically qualifying for application of chloropicrin or its mixtures and limited to authorized treatments companies.
- During the application of AGROCELHONE N the following personal protection must be used:

Complete neoprene mask with homologated filter.

Glasses

Gloves and neoprene boots



CONCLUSIONS (I)

- Methods and rates of application of AGROCELHONE were the same as used for MeBr, therefore there is no increase in the costs of treatment.

COSTS / HA						
	Cost/kg	Rate-Dosage	Film cost	Film consumption	Application	TOTAL
MeBr 50/50	4,60 €/kg	200 kg/Ha	1,25 €/kg	415 kg/Ha	144 €	1.583 €
Agrocelhone	3,20 €/kg					1.303 €

- The applications of AGROCELHONE in the trial period were always carried out in the same field, to see the possible incidences in MeBr effect during the last years (*remember* effect).

- The application of AGROCELHONE provided an excellent phytosanitary state for the crop development.



CONCLUSIONS (II)

- With the application of AGROCELHONE, the production quality and yielding obtained were comparable to those of MeBr.
- The localized application of AGROCELHONE, injected on the plantation bed, allowed the maintenance of microbial fauna.
- The application of AGROCELHONE allowed a free of residues production at harvest, accepted by the leading quality certification norms and standards.
- A certain herbicidal effect on germinating weeds was also observed.
- The treatment with AGROCELHONE in strawberry crop currently represents a 15-20% of this market, with growing perspectives in the next years.

