

Performance of Methyl Bromide Alternatives for Strawberry in Florida and Spain

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Why Strawberries?

- Florida:

- ***US\$180 million in almost 3,000 ha.***
- ***Winter production.***

- Spain:

- ***More than US\$400 million in 8,000 ha.***
- ***Highest yield efficiency in the world.***





**Damages by sting nematode
(*Belonolaimus*) and
anthracnose (*Colletotricum*)**

Scattered plant stands



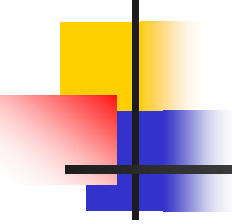
**Poor establishment leads to
heavy weed interference**



MBr + Pic

Non-treated

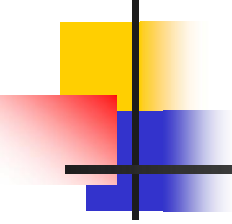




MBr Phase-Out

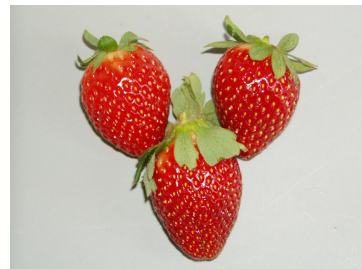
- Montreal Protocol and CUEs.
- Some alternatives:
 - *1,3-dichloropropene + chloropicrin (Pic)*
 - *Methyl iodide (MI; Midas)*
 - *Propylene oxide (Propozone)*
 - *Dimethyl disulfide (DMDS)*
 - *Dazomet (Basamid)*
 - *Metam sodium and metam potassium*

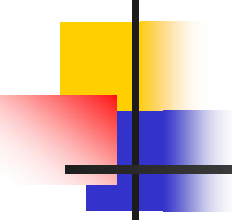




Objective

- **Compare the effect of selected MBr alternatives on strawberry yield and soilborne pest control.**





Spain and Florida Trials

- Two locations in Huelva, Spain.
- One location in Ruskin, Florida.
- Raised beds covered with mulch:
 - ***LDPE vs. VIF.***
 - ***Fumigant action = time + rate.***
- Large-plot research:
 - ***Extensive commercial practices.***



Large-plot research



Spain and Florida Trials

Tunnels



Open fields





Spain Trials

Fumigants	Rate (kg/ha)	Application
DMDS + Pic	<i>250+250</i>	<i>Chisel injected/VIF</i>
Telone C-35	<i>300</i>	
Pic	<i>300</i>	
MBr + Pic (50:50)	<i>400</i>	
Basamid	<i>400</i>	<i>Rototilled/VIF</i>
Propozone	<i>550</i>	<i>Chisel injected/VIF</i>
Control	<i>---</i>	<i>-----</i>



Florida Trials

Fumigants	Rate (kg/ha)	Application
DMDS + Pic	<i>250+250</i>	<i>Chisel injected/VIF</i>
Telone C-35	<i>300</i>	
Pic	<i>300</i>	
MBr + Pic	<i>400</i>	<i>Chisel injected/LDPE</i>
MBr + Pic	<i>300</i>	<i>Chisel injected/VIF</i>
Propozone	<i>550</i>	
MI + Pic	<i>230</i>	
Control	<i>---</i>	<i>-----</i>

Injection equipment



Bedding and mulching







Bare-root transplants

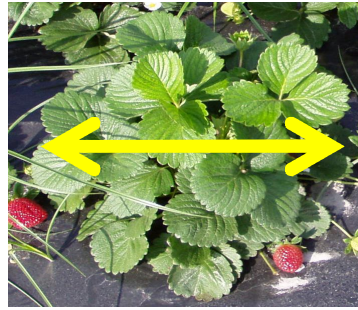


**Plant number, diameter and vigor.
Disease severity and weed density.
Marketable yield.**

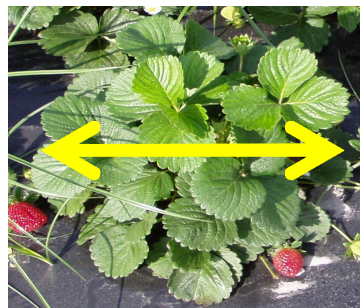


**Randomized complete block design.
4 & 6 replications.
ANOVA; Waller-Duncan at 5%.**





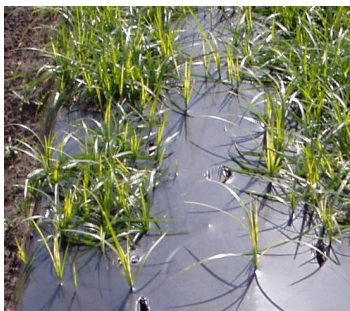
Fumigants	cm
DMDS + Pic	<i>20.4 a</i>
Telone C-35	<i>20.5 a</i>
Pic	<i>20.3 a</i>
MBr + Pic	<i>19.5 a</i>
Basamid	<i>18.7 ab</i>
Propozone	<i>16.7 bc</i>
Control	<i>15.4 c</i>



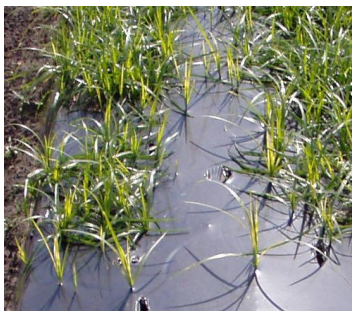
Fumigants	cm	t/ha
DMDS + Pic	<i>20.4 a</i>	<i>71.5 a</i>
Telone C-35	<i>20.5 a</i>	<i>70.2 a</i>
Pic	<i>20.3 a</i>	<i>68.8 a</i>
MBr + Pic	<i>19.5 a</i>	<i>66.5 a</i>
Basamid	<i>18.7 ab</i>	<i>60.2 b</i>
Propozone	<i>16.7 bc</i>	<i>59.9 b</i>
Control	<i>15.4 c</i>	<i>46.6 c</i>



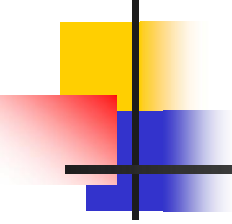
Fumigants	no/m ²
DMDS + Pic	5.8 b
Telone C-35	11.3 ab
Pic	53.1 a
MBr + Pic/LDPE	6.9 b
MBr + Pic/VIF	0 c
Propozone	23.5 a
MI + Pic	0.3 c
Control	18.1 a



Fumigants	no/m ²	1 to 10
DMDS + Pic	5.8 b	0 a
Telone C-35	11.3 ab	0 a
Pic	53.1 a	0 a
MBr + Pic/LDPE	6.9 b	2.9 b
MBr + Pic/VIF	0 c	0 a
Propozone	23.5 a	1.1 a
MI + Pic	0.3 c	3.9 c
Control	18.1 a	5.7 d



Fumigants	no/m ²	1 to 10	t/ha
DMDS + Pic	5.8 b	0 a	15.4 a
Telone C-35	11.3 ab	0 a	16.3 a
Pic	53.1 a	0 a	14.7 ab
MBr + Pic/LDPE	6.9 b	2.9 b	12.0 bc
MBr + Pic/VIF	0 c	0 a	17.1 a
Propozone	23.5 a	1.1 a	16.6 a
MI + Pic	0.3 c	3.9 c	10.9 c
Control	18.1 a	5.7 d	9.2 c



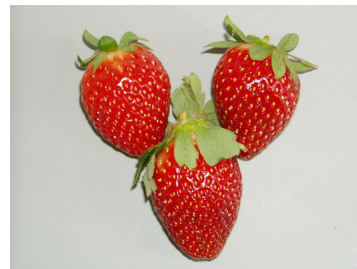
Summary

- **In Spain:**

- ***1,3-D + Pic, DMDS + Pic, & Pic = MBr + Pic.***

- **In Florida:**

- ***Similar results were found, with the exception of Propozone, which = MBr + Pic.***



Beach time!!!

