



Technical Information

THE INTELLIGENT CHEMICAL



FLUTOLANIL Fungicide

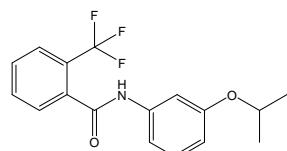


NIHON NOHYAKU CO., LTD.

■ Chemical and Physical Properties

Common name (ISO)	: Flutolanil
Chemical name(IUPAC)	: α,α,α -trifluoro-3'-isopropoxy-o-toluanilide
Water solubility	: 8.01 mg/L (20°C)
Partition coefficient	: Log Pow = 3.17
Formulation	: 6%Dust, 15%EC(w/w), 20%SC (w/w), 40%SC (w/w) , 50%WP

Structure formula



■ Toxicology

Mammalian toxicity

Acute oral LD ₅₀ (Rat)	: (male, female) > 10,000 mg/kg
Acute dermal LD ₅₀ (Rat)	: (male, female) > 5,000 mg/kg
Eye irritation (Rabbit)	: Not irritant
Skin irritation (Rabbit)	: Not irritant
Dermal sensitization	: (Guinea pig) negative

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(female)	> 2,000 mg/kg
(male, female)	> 2,000 mg/kg
	Slightly irritant
	Not irritant
(LLNA* in Mice)	Negative

40%SC

(female)	> 2,000 mg/kg
(male, female)	> 2,000 mg/kg
	Slightly irritant
	Not irritant
	Negative

*LLNA: Local lymph node assay

Ecotoxicity

Carp, LC ₅₀ (96hr) :	3.21 mg/L
Daphnia, EC ₅₀ (48hr):	>6.8 mg/L

■ Characteristics

1
Excellent fungicidal performance against Basidiomycete fungi

2
Curative and Protective properties by inhibiting an enzyme complex for respiration

3
Sufficient persistency with systemic activity

4
Broad ways of application; foliar spray, soil incorporation, soil drench and seed treatment

5
Less hazardous effect to mammals, crops and environment

■ Main Target Pathogens and Diseases

Basidiomycetes

Sclerotium (Corticium) rolfsii

White mold or Southern blight
(peanut, soybean etc.)

Thanatephorus cucumeris

Sugar beet leaf & root rot

Typhula incamata

Cereal snow mold

Typhula isikariensis

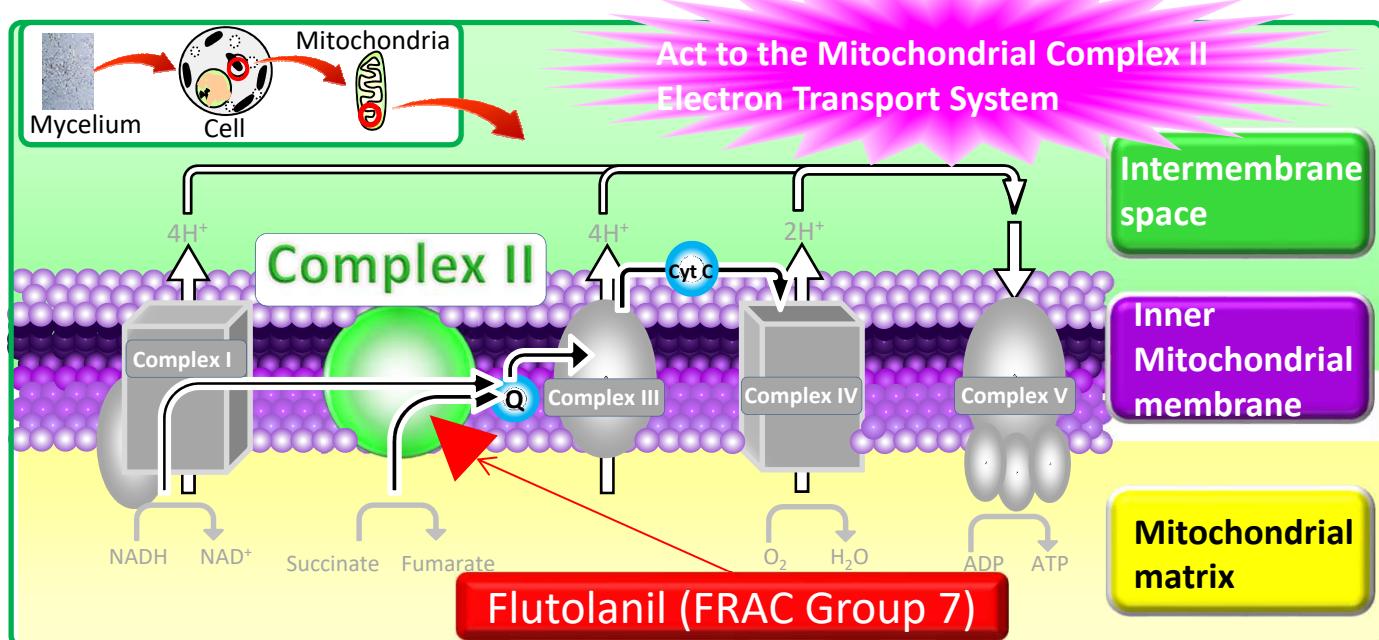
Cereal snow mold

Fungi Imperfecti

Rhizoctonia solani

Rice sheath blight,
Potato black scurf,
Peanut limb/pod rot,
Turf brown/large patch,
Vegetable damping-off

■ Mode of Action



Flutolanil is a SDHI (Succinate-dehydrogenase inhibitor) with narrow spectrum.

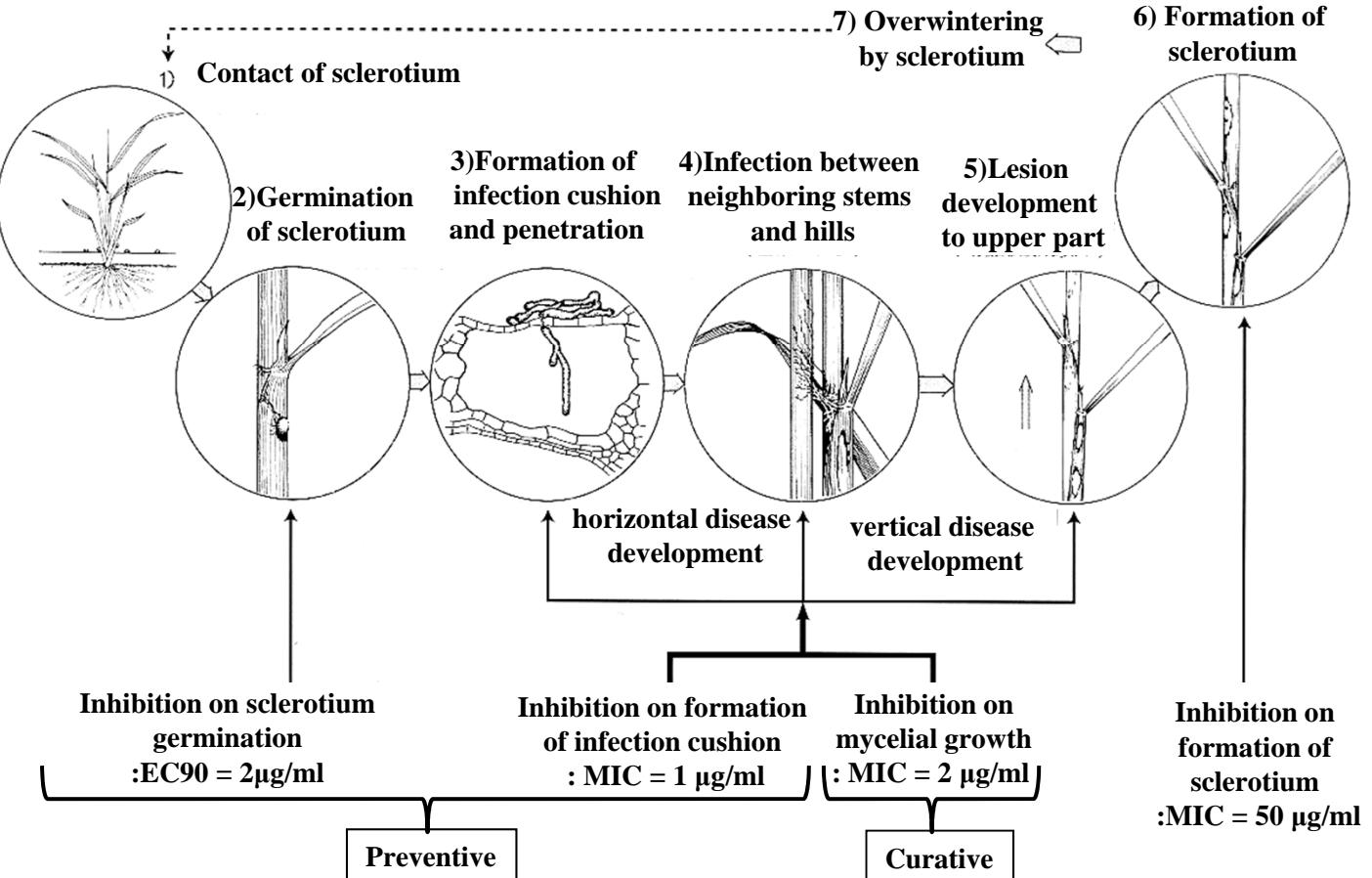
Target 1 : Rice Sheath Blight (*Rhizoctonia solani*)



Sclerotia

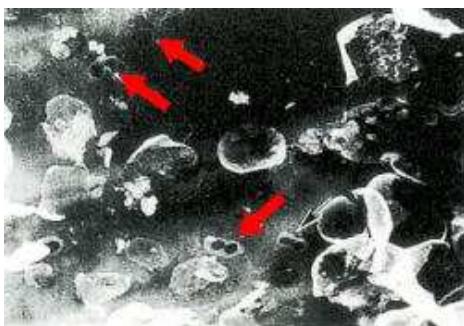


■ Life cycle of *Rhizoctonia solani* on rice and acting point of flutolanil



Flutolanil has inhibitory effect against development of each step of the infection cycle. Inhibition of invasion from sclerotium and mycelial growth result in preventive and curative effect in infection, respectively.

■ Preventive effect of Flutolanil on Penetration



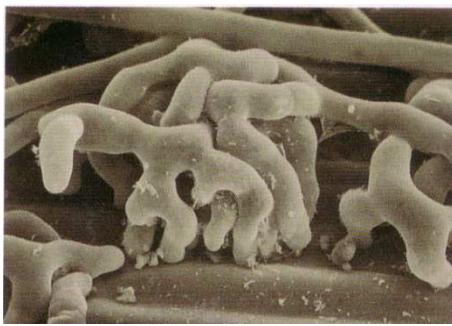
Control (48 h after inoculation)



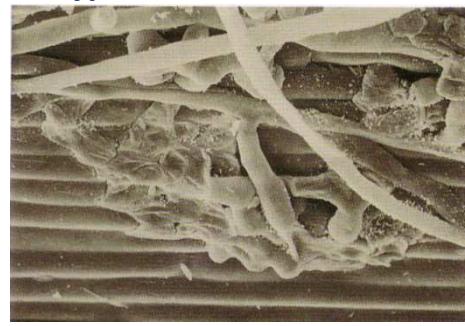
2 µg/g flutolanil in leaf sheath(48 h after inoculation)

Penetration pores (red arrow) in control were not observed in leaf sheath containing 2 µg/g flutolanil in Electron micrographs

■ Curative Effect of Flutolanil on Hyphae

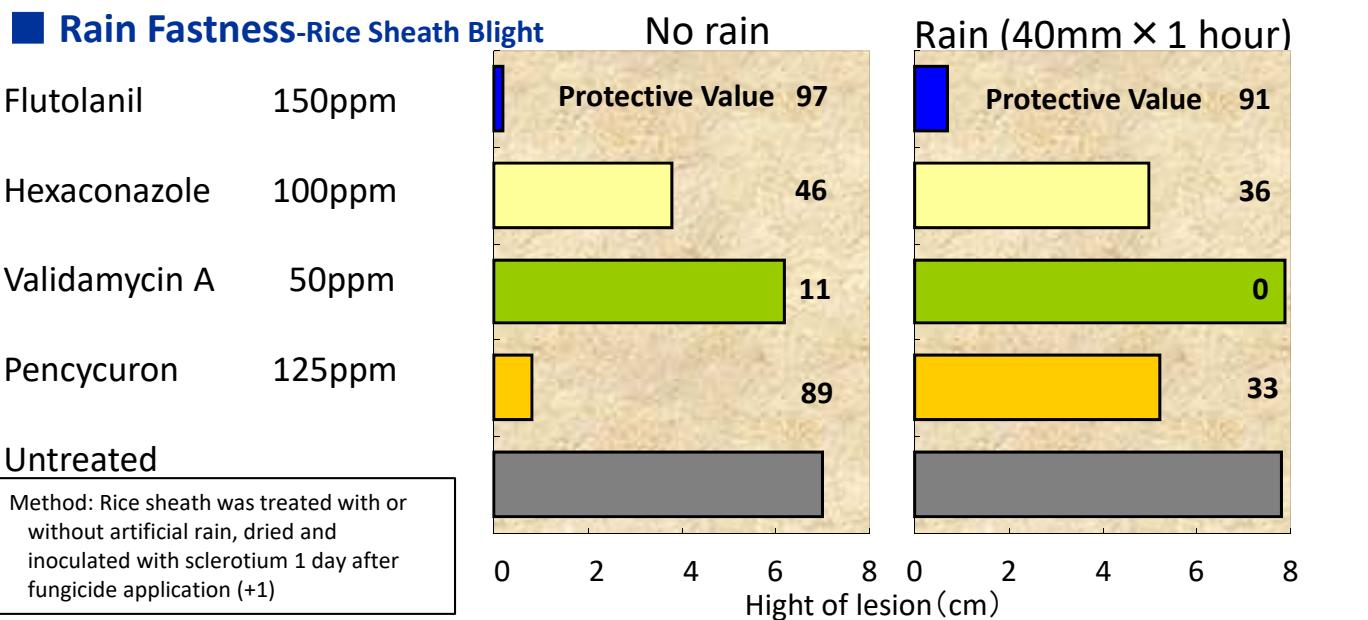


Control



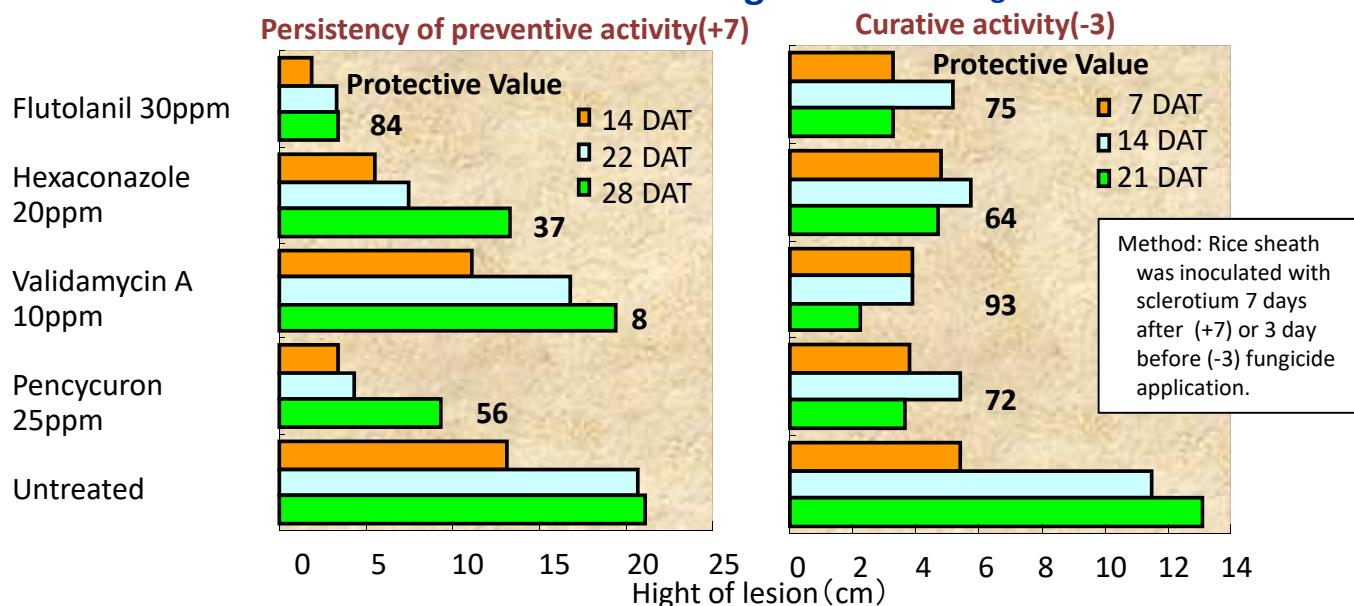
6 h after treatment

Electron micrographs of *Rhizoctonia solani* on rice sheaths treated with flutolanil at 2 µg/ml. Hyphae of the fungus was collapsed.



Flutolanil showed good rain fastness: Flutolanil > Pencycuron, Hexaconazole > Validamycin A

Characteristics of flutolanil at low dosage-Rice Sheath Blight

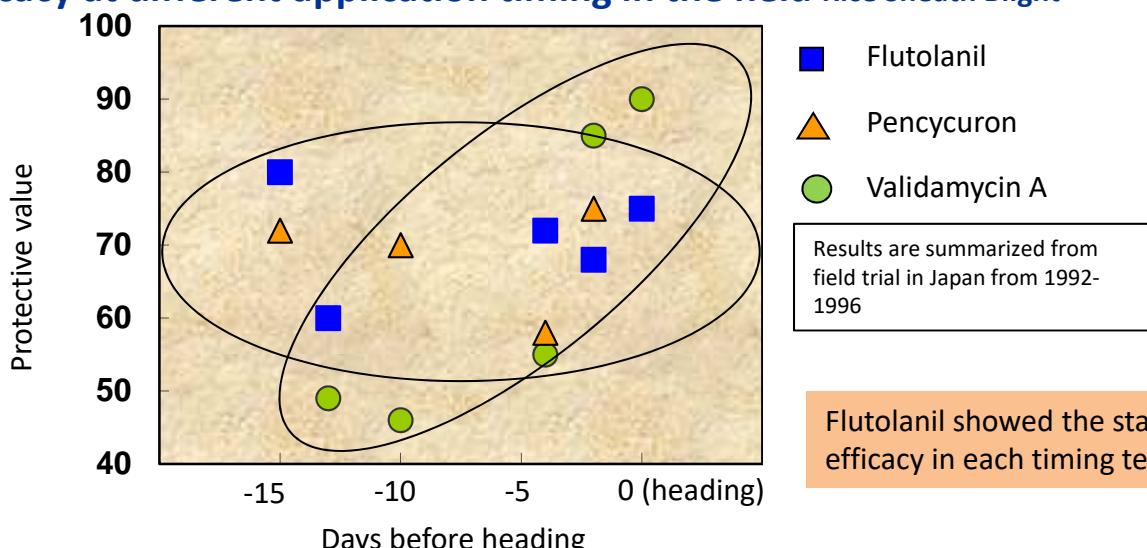


Flutolanil > Pencycuron > Hexaconazole > Validamycin A

Validamycin A > Flutolanil, Pencycuron > Hexaconazole

Flutolanil showed highest persistency and high curative activity

Efficacy at different application timing in the field-Rice Sheath Blight



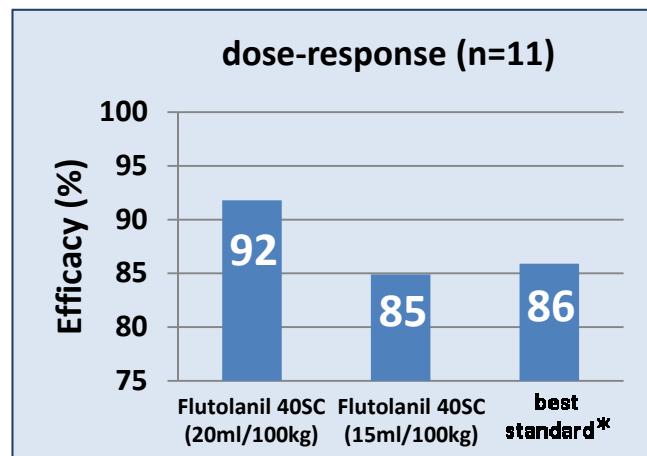
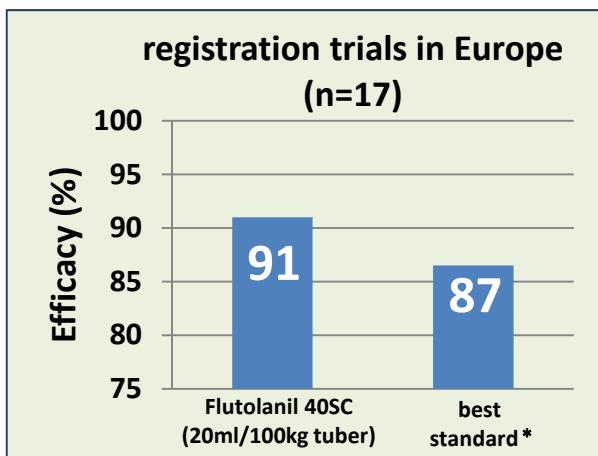
Target 2 : Potato Black Scurf (*Rhizoctonia solani*)



■ Characteristics of flutolanil on potato by tuber treatment

- 1) Outstanding effect on *Rhizoctonia solani*
- 2) Excellent crop safety
- 3) Others (side-effect on silver scurf, good toxicological profile)

1) Outstanding effect on *Rhizoctonia solani*

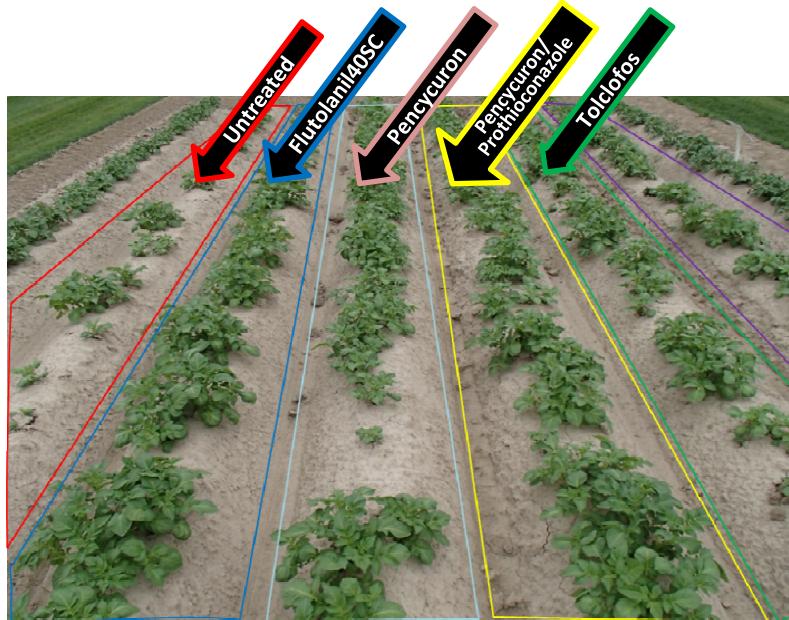


* Pencycuron, Fludioxonil

Flutolanil 40SC showed higher efficacy than best standard at standard dosage (20ml/100kg tuber), and lower dosage (15ml/100kg) showed equal activity to best standard

2) CROP SELECTIVITY IN POTATOES-tubers infected

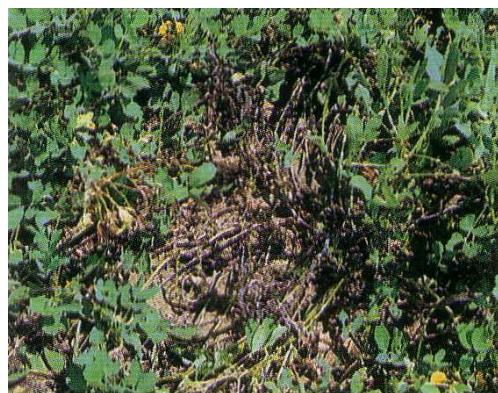
Netherlands 2015;
sprouts 0.5 cm



Source: Belchim Crop Protection, 2015

5 Flutolanil 40SC showed higher crop selectivity and efficacy in potatoes

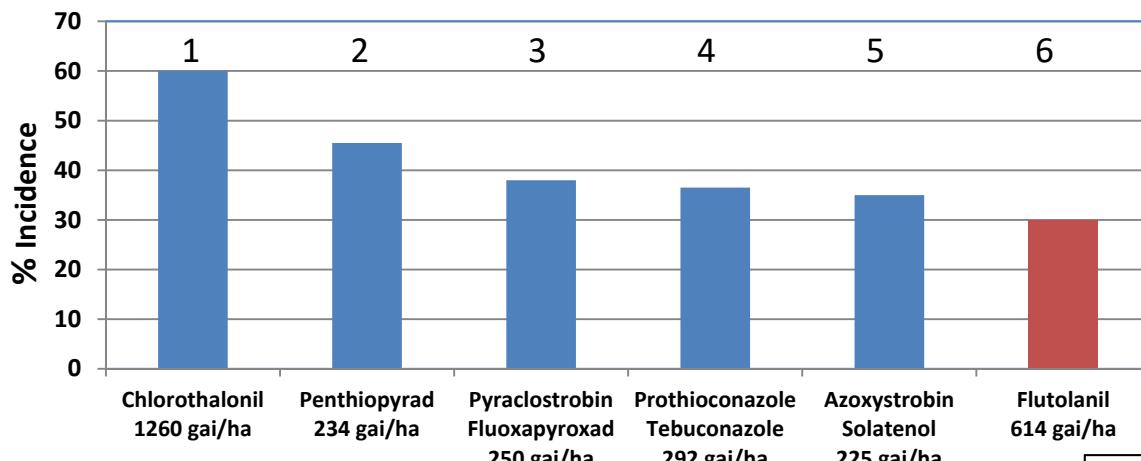
Target 3 : Peanuts White Mold (*Sclerotium rolfsii*)



■ Characteristics of flutolanil on peanuts

- 1) Outstanding effect on *Sclerotium rolfsii*
- 2) Also exhibit excellent control on limb/pod rot (*Rhizoctonia*)
- 3) Excellent crop safety

■ Efficacy of Flutolanil -White Mold



Flutolanil showed most excellent efficacy to White Mold

Dr. Tim Brenneman,
UGA,, Tifton GA, 2015

Application for upper and under figure

1: Chlorothalonil 1260 gai/ha (1-7)

2: Chlorothalonil 1260 gai/ha(1,2); Penthiopyrad 234 gai/ha+Chlorothalonil 1260 gai/ha (3,4,5); Chlorothalonil 1260 gai/ha (6,7)

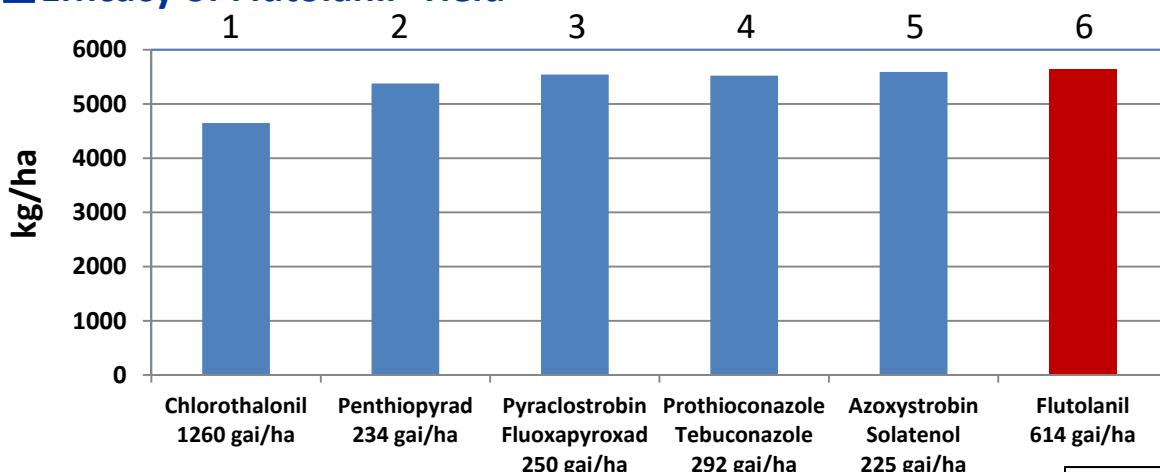
3: Chlorothalonil 1260 gai/ha(1,2); Pyraclostrobin•Fluoxapyroxad 250 gai/ha+Chlorothalonil 1260 gai/ha (3,4,5); Chlorothalonil 1260 gai/ha (6,7)

4: Chlorothalonil 1260 gai/ha(1,2); Prothioconazole•Tebuconazole 292 gai/ha+Chlorothalonil 1260 gai/ha (3,4,5); Chlorothalonil 1260 gai/ha (6,7)

5: Chlorothalonil 1260 gai/ha(1,2); Azoxystrobin•Solanenol 225 gai/ha+Chlorothalonil 1260 gai/ha (3,4,5); Chlorothalonil 1260 gai/ha (6,7)

6: Chlorothalonil 1260 gai/ha(1,2); Flutolanil 614 gai/ha+Chlorothalonil 1260 gai/ha(3,4,5); Chlorothalonil 1260 gai/ha (6,7)

■ Efficacy of Flutolanil -Yield



Flutolanil showed higher yield than other fungicide tested

Dr. Tim Brenneman,
UGA,, Tifton GA, 2015



FLUTOLANIL

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(17-9)