

XEDAVIR®

Biofungicida per le malattie fungine del terreno a base ti Trichoderma Asperellum TV1



Xeda Italia - Xeda International

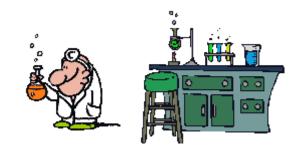
ATTIVITA' DI PRODUZIONE

Formulati a base di **microrganismi o di estratti vegetali** e una gamma di **prodotti nutrizionali** da utilizzare in agricoltura biologica ed integrata



ATTIVITA' DI RICERCA, SVILUPPO e SUPPORTO TECNICO

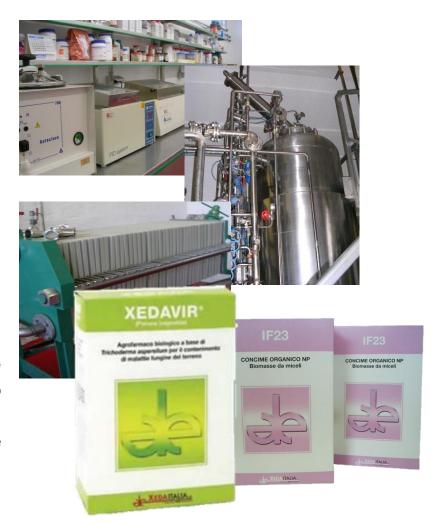
In laboratorio ed in campo in collaborazione sia con Università che con Centri di Saggio.



PROCESSO DI PRODUZIONE STANDARDIZZATO

- preparazione dell'inoculo nel laboratorio microbiologico
- produzione industrial nel bioreattore
- Raccolta della biomassa
- Formulazione e stabilizzazione
- Confezionamento

Durante tutte le fasi del processo produttivo, è previsto un rigoroso piano di controllo qualitativo, che permette di ottenere formulati commerciali con caratteristiche estremamente costanti ed elevata qualità



Laboratorio Microbiologico





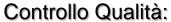


Strain vials









- Test biochimici
- Osservazioni microscopiche

Analisi morfologiche



Produzione industriale in bioreattore

Dopo aver superato tutti i test di laboratorio, le colture liquide sono utilizzate per l'inoculazione del bioreattore da 1500 litri, dove avviene la crescita del microrganismo e l'ottenimento della biomassa relativa

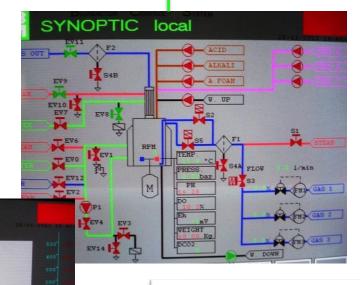


In queste fasi, si opera ovviamente in condizioni di assoluta sterilità



HISTORY local

All'interno del bioreattore è possibile monitorare i parametri che influenzano il processo di crescità microbica, pH, temperatura e l'ossigeno disciolto in modo da mantenere ottimali condizioni per la crescità della biomassa



Processo ripetibile Processo standardizzato Elevata qualità produttiva

The "biological approach "

- How micro-organisms may compete among them..? - FOUR main mechanisms:

beneficial Pathogen / pest **Antibiosis** active substances direct Competition medium **Parasitism** indirect Induced resistence host

Competitive strains of Trichoderma sp.: general thoughts

antibiosis	
competition	
parasitism	<u>U</u>
Induced resistence	

A complete and "modulated" mechanism of action



A wide number of (soilborne) targets

Pythium (*)

Pytophthora (*)

Rhizoctonia (*)

Verticillium (*)

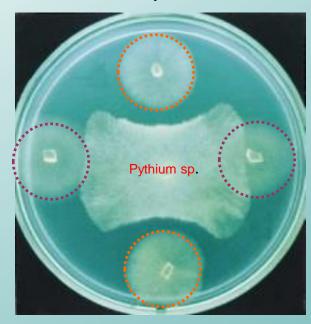
Botrytis

(*) main targets



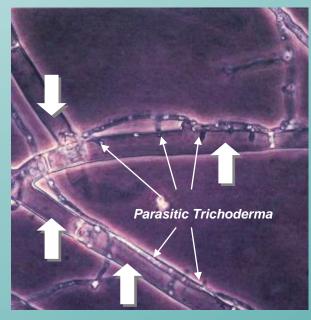
Trichoderma spp.: possible modes of action (*)

Antibiotic production



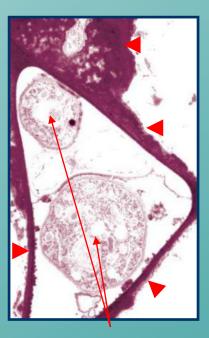
Colonies of Trichoderma sp. producing gliovirin
Colonies of Trichoderma sp. *not* producing gliovirin

Direct parasitism



Rhizoctonia solani

Defense induction



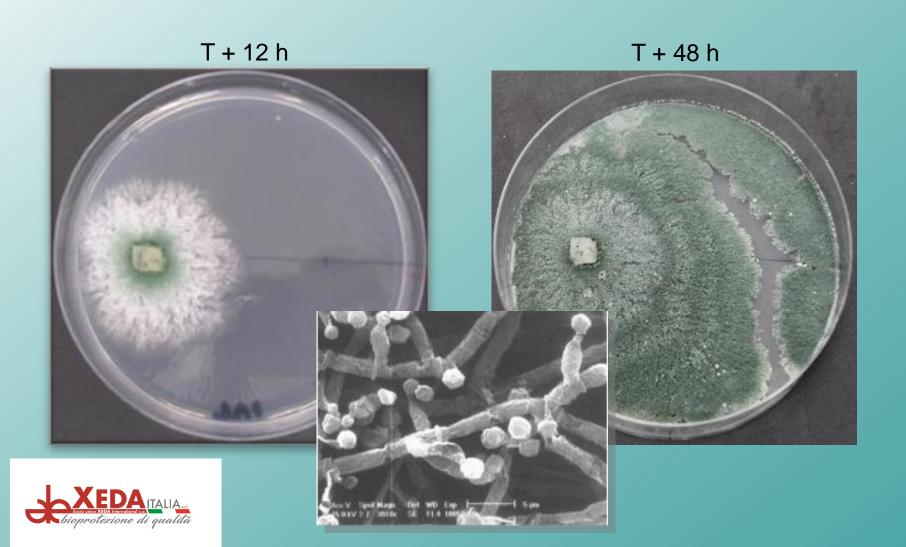
Trichoderma hyphae

Defense barriers



XEDAVIR ®

Highly competitive strain of Trichoderma asperellum TV1



Trichoderma spp., general features (*)

Naturally occurring in soils

High reproductive capacity

Very-efficient utilisation of soil nutrients → high competitivity or "fitness"

Multi-site way of action → reduced or no-risk of resistence

Ability to survive under unfavourable conditions

No chemical residues on crops and soils



XEDAVIR

(Polvere bagnabile)

Agrofarmaco biologico a base di Trichoderma asperellum per il contenimento di malattie fungine del terreno

COMPOSIZIONE XEDAVIR

EUH 208: Contiene Trichoderma asperellum. Può provocare una reazione allergica.

ATTENZIONE MANIPOLARE CON PRUDENZA

XEDA INTERNATIONAL S.A.

Sede legale: Z.A. La Crau, 13670 Sant-Andiol Francia

Autorizzazione Ministero della Salute n. 13838 del 06.10.2008

Distribuito da:

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Stabilimento di produzione:

Xeda International S.A.-z.a. La Crau, Sant-Andiol (Francia)

Officina di confezionamento:

Xeda International S.A.- Sant-Andiol (Francia) KOLLANT S.r.I. – Maniago (PN)

Confezioni:

0.200-0.250-0.500 1-5-10-20 kg

Partita nº

CONSIGLI DI PRUDENZA: Conservare fuori dalla portata dei bambini. Conservare lontano da alimenti o mangimi e da bevande. Non mangiare né bere durante l'impiego. Non fumare durante l'impiego. Evitare il contatto con la pelle. Evitare il contatto con gli occhi. In caso di contatto con gli occhi, lavare immediatamente e abbondantemente con acqua e consultare un medico Usare indumenti protettivi e guanti adatti. In caso di incidente o di malessere consultare immediatamente il medico (se possibile mostrargli l'etichetta).

Prescrizioni supplementari: Non contaminare l'acqua con il prodotto o il suo contenitore. Non contaminare altre colture, alimenti, bevande e corsi d'acqua. Non pulire il materiale d'applicazione in prossimità delle acque di superficie. Evitare la contaminazione attraverso i sistemi di scolo delle acque dalle aziende agricole e dalle strade. Per evitare rischi per l'uomo e per l'ambiente seguire le istruzioni per l'uso.

INFORMAZIONI MEDICHE: In caso di intossicazione chiamare il medico per i consueti interventi di pronto soccorso.

Avvertenza: consultare un centro antiveleni

CARATTERISTICHE

Trichoderma asperellum ceppo TV1 è un fungo antagonista con elevata competitività e capacità di colonizzazione dello spazio e dei substrati di crescita, nonché capacità di difesa delle risorse nei confronti di altri organismi del terreno. Queste caratteristiche, unite ad un'elevata adattabilità a condizioni pedo-climatiche diverse, lo rendono un antagonista ideale nel terreno, dove esplica azione di repressione e contenimento verso i responsabili dei marciumi radicali, quali: Pythium spp., Phytophtora capsici, Rhizoctonia solani e Verticillium spp.

Il ceppo TV1 è comunemente presente in natura (e nel terreno) e non modificato geneticamente.

EPOCA. DOSI E MODALITÀ DI IMPIEGO

Colture orticole (aglio, asparago, basilico, bietola da foglia e da costa, carciofo, cardo, carota, cavoli, cerfoglio, cetriolo, cicoria, cipolla, cocomero, colza, crescione, dolcetta, erba cipollina, fagiolo, fagiolino, finocchio, fragola, indivia, lattuga, lavanda, maggiorana, malva, melanzana, melissa, melone, menta, patata, peperone, pomodoro, porro, prezzemolo, radicchio, rapa, ravanello, rosmarino, ravizzone, rucola, salvia, scalogno, scarola, sedano, spinacio, tabacco, timo, zucca, zucchino), officinali, floricole, ornamentali, prati e campi sportivi.

Applicazione	Dosi d'impiego
In serra e pieno campo	5 kg/ha
In terricci e torbe	0.5 – 1 kg/m ³

Applicare il prodotto preventivamente, in pre-semina o pre-trapianto oppure alla semina o al trapianto. Il prodotto va applicato per fertirrigazione o irrigazione a goccia.

Preparazione della soluzione: versare gradatamente il prodotto in un secchio e stemperare agitando, versare nella botte e mantenere in agitazione la soluzione per tutto il periodo del trattamento.

Avvertenze: Conservare la presente confezione al riparo dai raggi del sole in luogo fresco e asciutto ed a una temperatura non superiore ai 25°C. Rispettando tali condizioni il preparato mantiene la sua efficacia per almeno 8 mesi. In frigorifero la capacità germinativa viene conservata per almeno 12 mesi.

Evitare irrigazioni eccessive subito dopo il trattamento. COMPATIBILITÀ

Il preparato è miscelabile con tutti i prodotti insetticidi, fertilizzanti, erbicidi, (ad eccezione dei formulati contenenti oxadiazon e pendimetalin) fungicidi (ad eccezione dei prodotti a base di azoxystrobin, chlorthalonil, dicloran, iprodione, mancozeb, penconazolo, thiram e tolclofosmetile).

FITOTOSSICITÁ: Il preparato sulle colture indicate in etichetta è perfettamente selettivo.

Attenzione

Da impiegarsi esclusivamente per gli usi e alle condizioni riportate in questa etichetta; Chi impiega il prodotto è responsabile degli eventuali danni derivanti da uso improprio del preparato; Il rispetto di tutte le indicazioni contenute nella presente etichetta è condizione essenziale per assicurare l'efficacia del trattamento e per evitare danni alle piante, alle persone ed agli animali; Non applicare con i mezzi aerei; Per evitare rischi per l'uomo e per l'ambiente seguire le istruzioni per l'uso (art. 9, comma 3, D. L. vo n° 65/2003); Operare in assenza di vento; Da non vendersi sfuso; Smaltire le confezioni secondo le norme vigenti; Il contenitore completamente svuotato non deve essere disperso nell'ambiente; Il contenitore non può essere riutilizzato.

Avvertenza: in caso di miscela con altri formulati deve essere rispettato il periodo di carenza più lungo. Devono inoltre essere osservate le norme precauzionali prescritte per i prodotti più tossici. Qualora si verificassero casi di intossicazione, informare il medico della miscelazione compiuta.

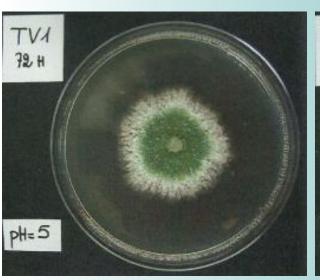
Wide Ph and temperature-range

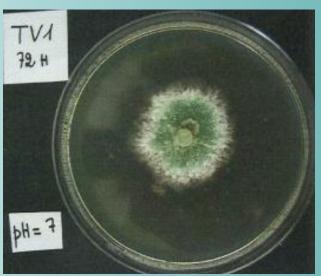
Resistance to fungicide residues

Good biologic activity



Resistence to adverse factors: soil ph







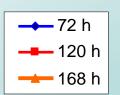


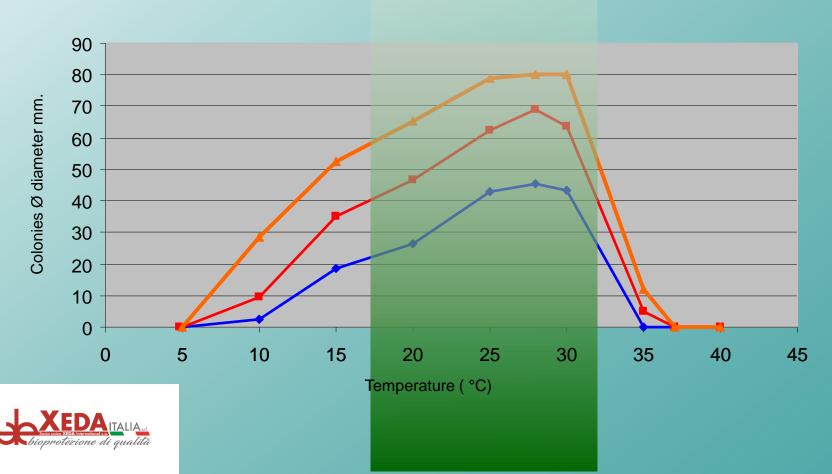
Resistence to adverse factors: soil ph





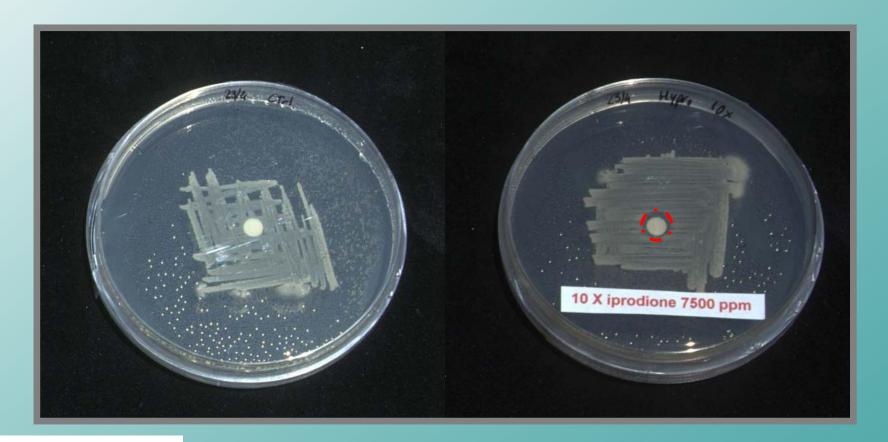
Good temperature - range





High tolerance to fongicide residues

- lab. Evaluation methods -





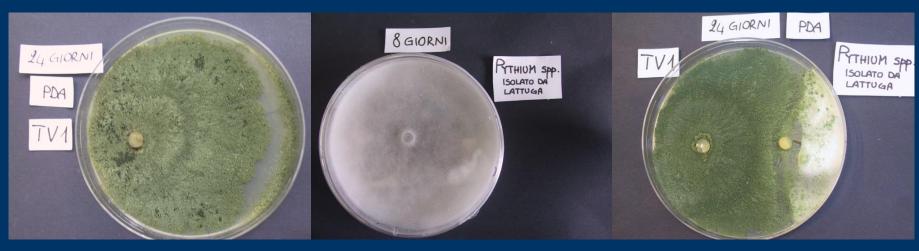
High tolerance to fongicide residues (follows)





- a recall to anthibiosys effects of Trichoderma competitive strains -

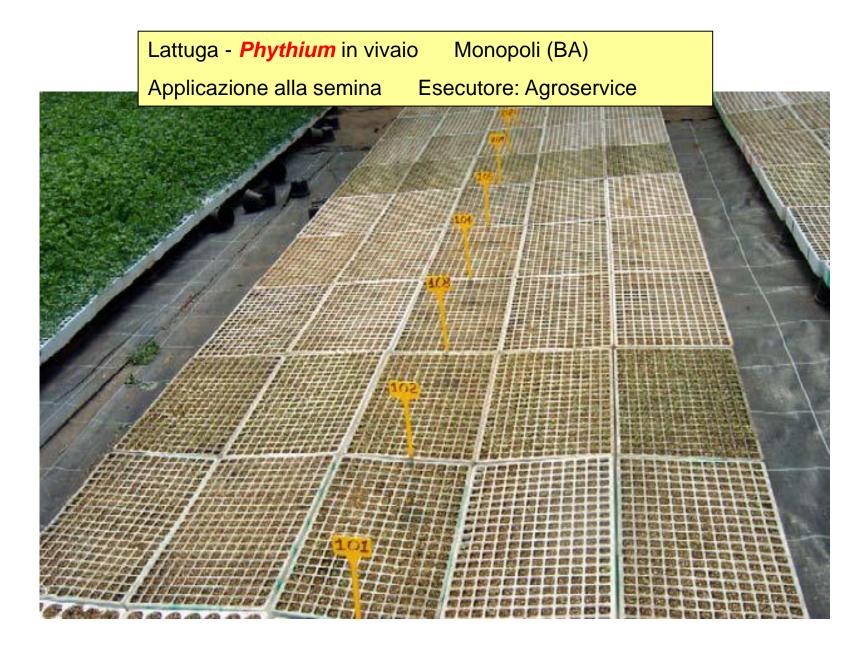
Pythium sp.



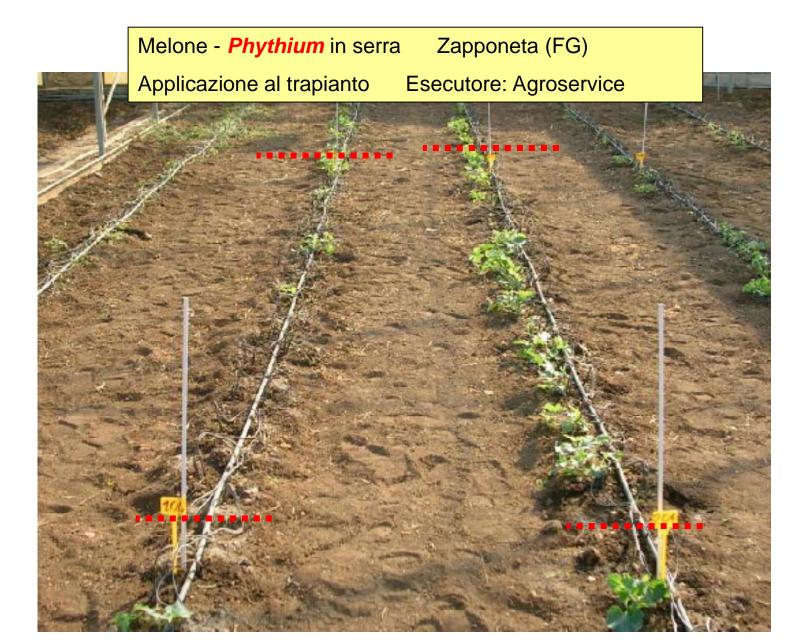
Rhizoctonia solani



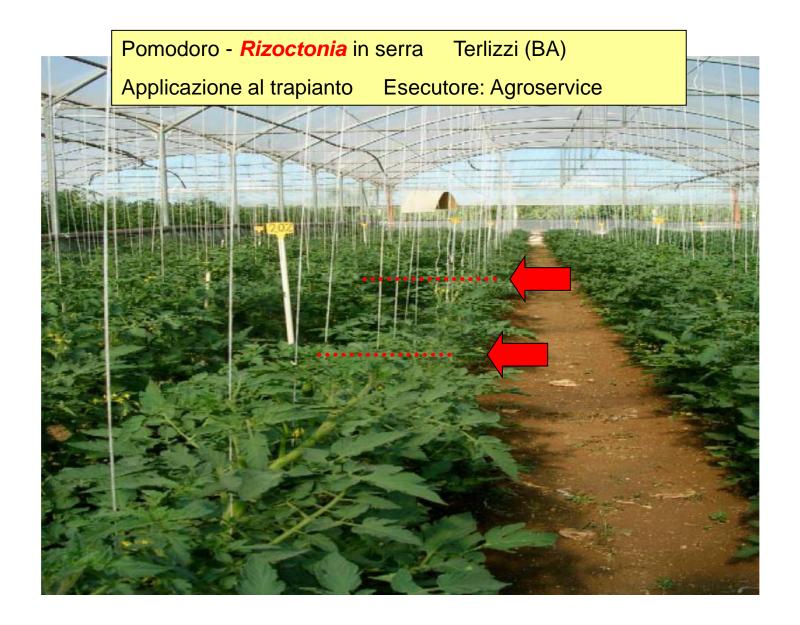














Patata – *Rizoctonia solani* in campo

Bologna (BO)

Applicazione: (5kg/ha) al trapianto

Esecutore: Anadiag





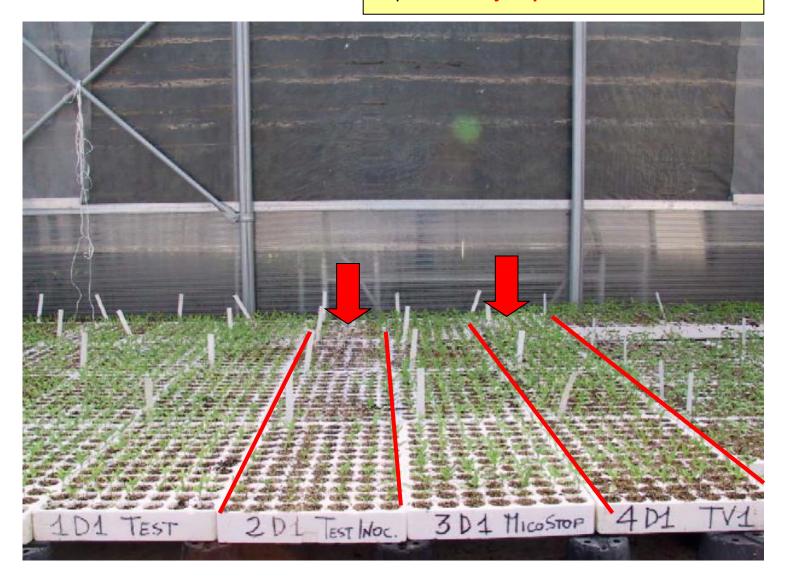
Patata – *Rizoctonia solani* in campo Bologna (BO)

Applicazione: (kg/ha) al trapianto Esecutore: Anadiag





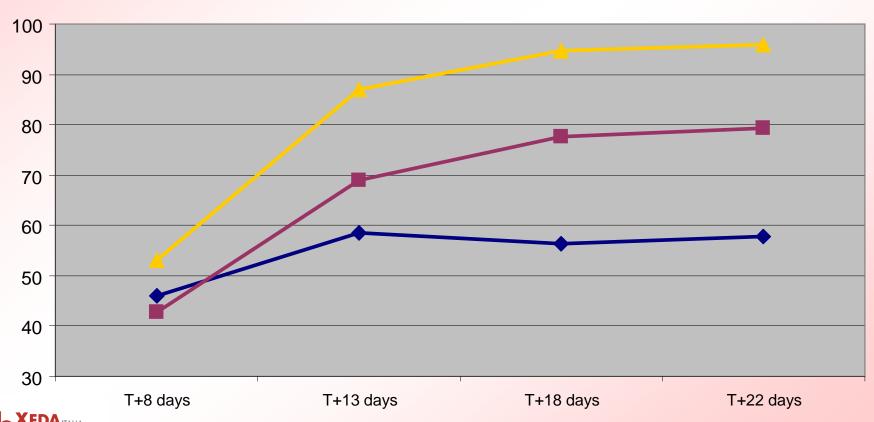
Peperone - *Phythoptora* in vivaio



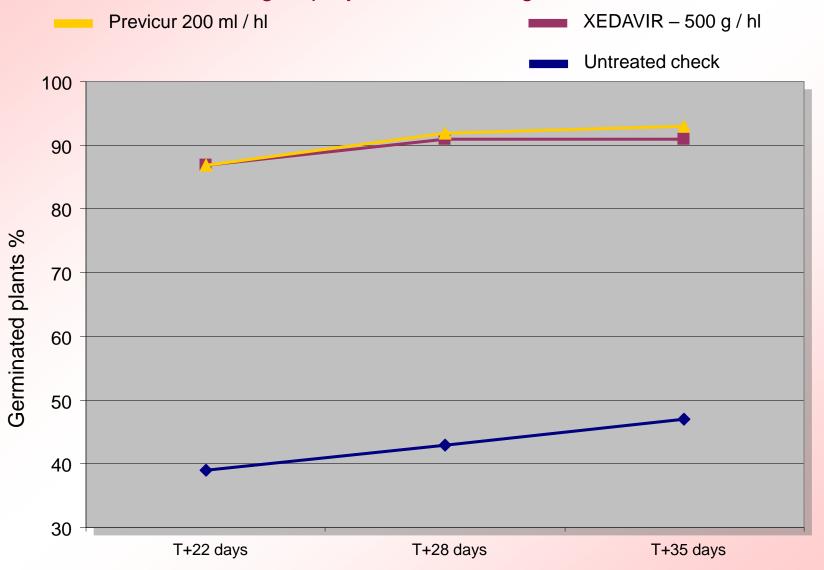
1) Pythium spp on lettuce seedlings in nursery Single spray on benches in greenhouse

Previcur 200 ml / hl Xedavir – 500 g / hl
Untreated check

% emerged plants



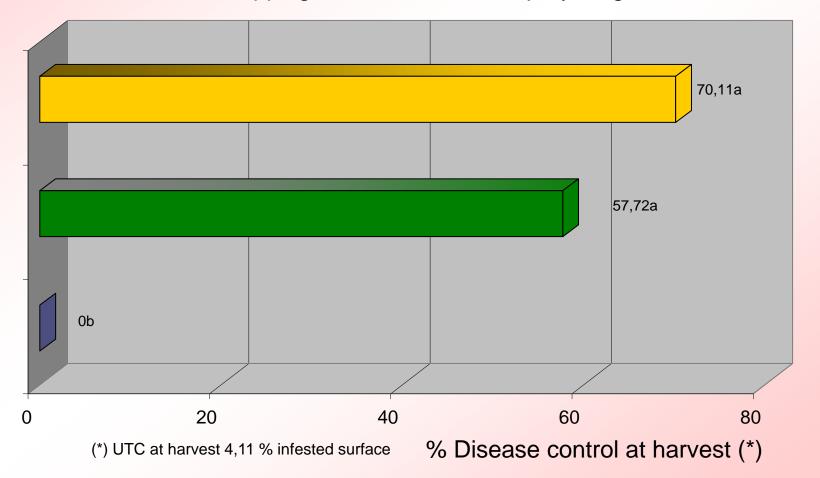
3) Pythium spp on cabbage seedlings in nursery Single spray on benches in greenhouse



4) Potato Black Scrurf from Rhizoctonia solani

Sowing: May, 25 th – Harvest: Nov. 11st

- Untreated Standard pencycuron = Monceren 1500 g/hl seed dipping 5'
- TV1 500 ml/hl seed dipping 5' + TV1 in-furrow spray 5 kg / ha



5) Pepper blight by Phytophthora capsici in nursery

Untreated Ref. Bio: Mycostop (Streptomyces sp.) 20 g / hl XEDAVIR - 500 g / hl 350 300 293,0a 281,0a 280,0a n° germinated seeds / plot 250 200 200,3b 149,3a 150 149,5b 140,8a 100 50 45,8b 0 T+10 T+14 T+28

TV 1-Xedavir

Resuming features

Special for early applications against soilborne pathogens

Wide range of action: Pythium, Phytophthora, Rhizoctonia, Verticillium spp.

Temperature range 15÷35 ° C – ideal for nursery - glasshouse

Highly selective on every crop

"Clean" product with no residues on crops

Good compatibility with fungicides and other chemicals

Excellent packaging & good shelf-life: at least 8 months at standard T

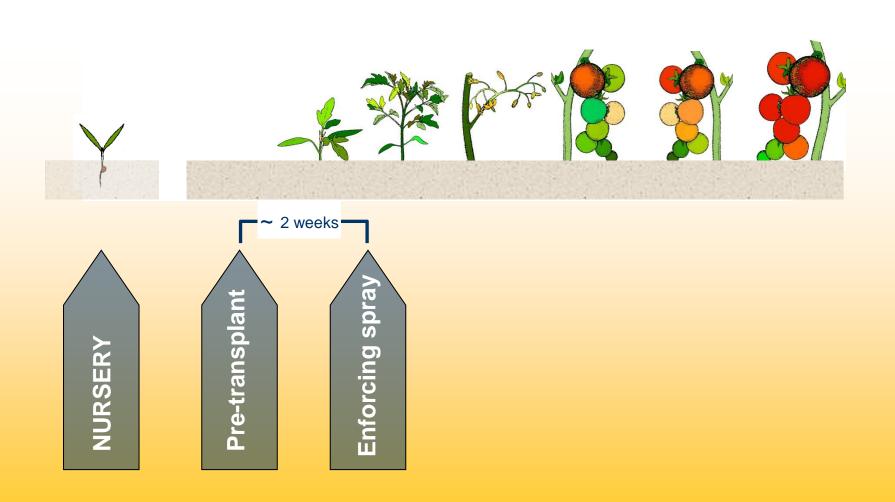
Xedavir – uses & positioning

- Main uses in Italy -

- 1) In nurseries
- Incorporated to soil: 0,5-1 kg every m³
- Standard sprays: 0,5 kg every 1000 m²
- 2) In greenhouse at open field from spring to fall
- Sprays at 0,5 kg every 1000 m² i.e. 3-5 kg / ha

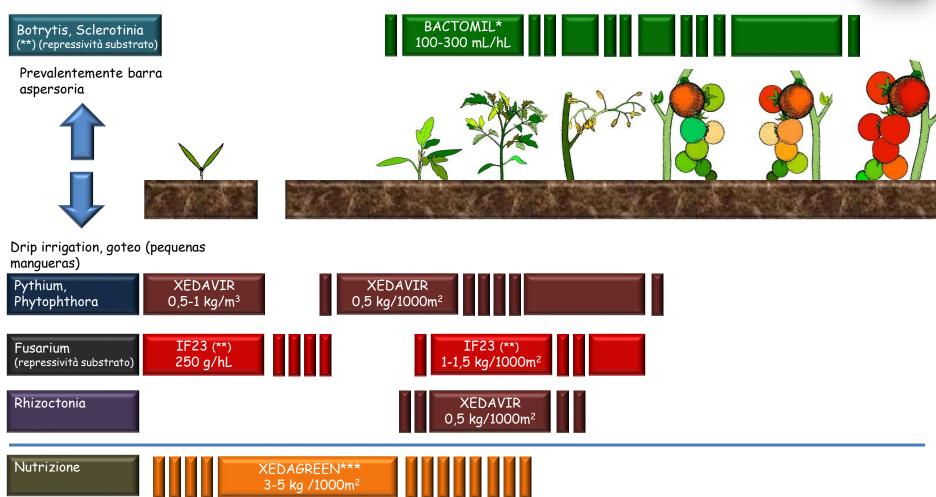
Xedavir – uses & positioning

- Suggested positioning in Italy -



Xedavir application with other microrganisms





- (*) Fertiliser formulation with Bacillus subtilis
- (**) Fertiliser formulation with *Fusarium oxysporum* antagonist (hypovirulent)
- (***) Fertiliser formulation with mycorrhyzal fungi

TV1-Xedavir

Final remarks – good application practices

Good moisture of soil essential to obtain efficacy

Suggested irrigation to incorporate into soil after spray

Good organic matter in soils improves efficacy

Neutral / slightly acid soils to be preferred

Possible pre-germination in water for 12-24 h to improve activity



FAQ (frequently asked question) about Xedavir







Storage Temperature

XEDAVIR Italy

Conservare la presente confezione al riparo dai raggi del sole in luogo fresco e asciutto ed a una temperatura non superiore ai 25°C. Rispettando tali condizioni il preparato mantiene la sua efficacia per almeno 8 mesi. In frigorifero la capacità germinativa viene conservata per almeno 12 mesi.

Keep the product away from direct sunlight, cool and dry at a temperature not exceeding **25° C**. By respecting these conditions, the produce retains all its effectiveness at least **8 months**. In the cold the germination power is maintained until at least 12 months

XEDAVIR Grecee

Διατηρείται στην αρχική του απαραβίαστη συσκευασία, σε χώρο καλά αεριζόμενο, ξηρό και δροσερό (με θερμοκρασίες έως 30oC). Σε αυτές τις συνθήκες παραμένει σταθερό για εννέα (9) μήνες σε θερμοκρασία δωματίου από την ημερομηνία παρασκευής

του ή για τουλάχιστο δώδεκα (12) μήνες σε κανονική ψύξη στο ψυγείο.

Store in its original undamaged packaging, in a well-ventilated, dry and cool place (with temperatures up to 30° C). In these conditions it remains stable for **nine (9) months** at room temperature from the date of its preparation or for at least twelve (12) months in normal refrigeration in the refrigerator.





Storage Temperature

XEDAVIR France

Conserver la spécialité à l'abri des rayons du soleil, au frais et sec à une température ne dépassant pas **25°C**. En respectant ces conditions le pro-duit conserve toute son efficacité au moins **8 mois**.

Au froid le pouvoir germinatif est maintenu jusqu'au moins à **12 mois**

Keep the product away from direct sunlight, cool and dry at a temperature not exceeding **25° C**. By respecting these conditions, the produce retains all its effectiveness at least **8 months**. In the cold the germination power is maintained until at least 12 months

XEDAVIR Spain

P411 – Almacenar a una temperatura que no exceda de **30° C**La capacidad germinativa se almacena durante **9 meses**



Lainco decision!!!!





How should it be stored?

The package of XEDAVIR has to be stored away from sun's rays in a cool, dry place and with a temperature not higher than 25° C or, **eventually if it is possible**, into the fridge. Once it is opened, the bag has to be used within some day. Like covered on the label.



< +25°C



< +5°C

Which is the expiry date?

XEDAVIR keeps its efficacy at least for 8 months. Eventually Into the fridge the shell-life is about 12 months. Like covered on the label.

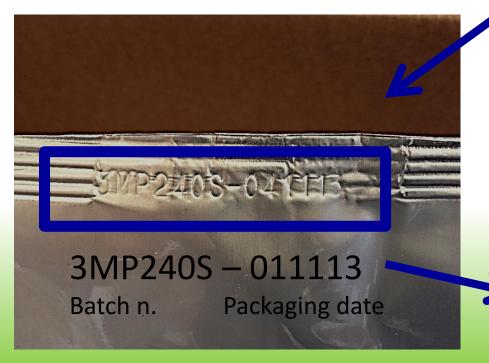






Where I can find the expiry date?

The date of production and packaging is printed (with heat sealer) in the imprint of the internal aluminium bag with the number of batch.







Which pathogens and deseases is it able to prevent?

XEDAVIR carry out a suppression and control action towards the accountables of root rots, like: *Pythium* spp., *Phitophtora capsici*, *Rhizoctonia solani* and *Verticillium* spp. Like covered on the label.

When should it be used?

Apply the product preventively, during pre sowing or pre transplanting phases, otherwise at sowing and transplanting time.

Which is the recommended rate?

Use XEDAVIR with an amount of 3-5 kg/ha for greenhouse and field applications or 1 kg/m³ if it is mixed with peat and composts. Like covered on the label.







How many treatments are required?

Usually a single application (preventive) of XEDAVIR is enough. Considering the climatic conditions and the duration of the crops (if medium or long lasting) it is suggested to repeat the treatment after 15 days, with an amount of 3 kg/ha in order to improve the colonisation action obtained after the first application.

How should it be distributed?

Apply the product trought splinker irrigations, fertigation, weed control equipments.







Should it be used alone?

XEDAVIR can be mixed (in the same tank) with all insecticides, fertilizers, herbicides, fungicides (with the exception of products based on azoxystrobin, chlorthalonil, dicloran, iprodione, mancozeb, penconazole, thiram e tolclofosmethil). It is necessary to separate the treatment with XEDAVIR at least at 5-7 days from the application of the incompatible plant protection products.





TV1 tolerance to fungicides



+++ no inhibition ++ partial inhibition +/- high inhibition

FUNGICIDES (1/2)		
Azoxystrobin	Ortiva	2,5 g/l
Boscalid	Cantus	120 g/hl
Boscalid + pyraclostrobin	Signum	1,8 kg/ha
Captan	Captan 50	250 g/hl
Carbendazim	Bavistin FL	500 ml/ha
Ciprodinil + fludioxinil	Switch	0,8 g/l
Cymoxanil	Cymoxan 45 WG	100 g/hl
Copper Oxichloride	Cuprocaffaro	1000 g/hl
Copper sulphate	Kaytee	0.4 g/l
Dithianon	Delan	1,5 g/l
Diclofluanide	Euparen	200 g/hl
Dichloran	Sclerosan	200 g/hl
Dimethomorph	Forum	700 g/hl
Difenoconazole	Score 25 EC	5 g/l
Dodine	Dodene 35 L	0.2 l/hl

++	
+++	
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+++	
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+++	

TV1 tolerance to fungicides (follows)



FUNGICIDES (2/2)		
Etridiazole	Terrazole 25% EC	10 ml/l
Fenamidone+Fosetil Al.	Curit Duo	300 g/hl
Fenexamid	Teldor	0,15%
Flutolanil	Moncut 40 SC	150 g/hl
Fosetil-alluminium	Aliette	600 g/hl
Hymexazol	Tachigaren LS	200 g/hl
Iprodione	Rovral	1,5 g/l
Mancozeb	Penncoseb DG	600 g/hl
Metalaxil-m	Ridomil Gold 480	600 g/hl
Methyl- Thiophanate	Enovit-metile DF	250 g/hl
Penconazolo	Topas	0,45 ml/l
Pencycuron	Pencuron	800 ml/hl
Pirimetanil	Scala	2 ml/l
Procymidone	Sialex 50 WDG	1,5 kg/ha
Procloraz	Octave	100 g/hl
Propamocarb	Previcur	2 ml/l
Sulfur	Microlux	600 g/hl
Thiram	Pomarsol	300 g/hl
Tolclofos methyl	Rizolex	2 g/l

TV1 tolerance to fungicides (follows)



Tolilfluanide	Euparen Multi	150 g/hl	
Triadimenol	Bayfidan EC	40 ml/hl	
Vinclozolin	Ronilan	4 kg/ha	
INSECTICIDES			
Abamectine	Vithal Cliner	2,1 ml/hl	
Acephate	Orthene S	300 g/hl	
Acetamiprid	Epik	200 g/hl	
Buprofezim	Applaud	300 g/hl	
Chlorpyrifos	Pennphos AG	900 ml/hl	
Deltametrine	Decis Jet	600 ml/hl	
Flonicamid	Teppeki	0,14 kg/ha	
Flufenoxuron	Cascade 50 DC	400 ml/hl	
Imidacloprid	Confidor 200 SL	150 ml/hl	
Pirimicarb	Afib	400 g/hl	
Spirotetramat	Movento 48 SC	300 ml/hl	
HERBICIDES			
Dinitramine	Cobex	10 ml/l	
Fluazifop-p-butyl	Fusilade N13	6,7 ml/l	
Oxadiazon	Ronstar FL	6,7 ml/l	
Pendimethalin	Stomp 330 E	12,5 ml/l	
Propyzamide	Kerb Flo	10 ml/l	



How should the solution to sprinkle be prepared?

It is essential to prepare a pre-mixture pouring the product in a bucket gradually, then the product has to be poured in a tank and the solution has to be mixed by shaking for all the treatment period.

When I apply XEDAVIR can there be a problems of filling and occlusion of nozzles and filters?

No. If you respect the indication above mentioned (pre-mix in a bucket) the product is suspended very well in water.

In very rare cases, if there was a small solid deposit in the bucket, don't put in the barrel/tank such solid deposit.

N.B. Comment: that eventually solid deposit IS NEVER *Trichoderma* propagules but inert particle adjuvants.







Which is the amount of water required?

It doesn't exist an optimal amount of water: it has to be calculated in order to guarantee an uniform distribution trought a suitable wetting of the soil.

Which is the optimal pH of the sprinkled solution?

Control and , if necessary, keep the pH of the solution containing the antagonist at generally acid levels (pH 5,5 - 6) through the addiction of common acidifying. A sub-acid setting helps *Trichoderma asperellum* to germinate and enhace itself faster once it is applied to the soil.

Is it possible to use it also in a particularly dry soil?

Yes. If it isn't expected an irrigation immediatly after the application of XEDAVIR, it is suggested to make it before the treatment if it's possible.







At the time of the treatment which is the soil temperature required?

XEDAVIR acts in soil with temperature between 6° C and 37°C. Obviously the growth speed decreases getting closer to the thermal extremes.

Is it possible to use it also in a poor organic matter soil (< 1%)?

Yes, it can be useful adding to the solution containing XEDAVIR a fluid fertilizer which has to be abundant of organic matter (e.g. amino acids, humic acids) in order to provide nitrogen and organic carbon for the fungus during the initial stage of growth.







And if the soil is particulary abundant of sodium?

Trichoderma asperellum grows in soils with a concentration of NaCl greater than 1,5 M even if with a lower speed compared to non-saline soils.

The soil was recently exposed to sunburn or chemical pest control, is it a problem?

Absolutely not, on the contrary soil which have been exposed to fumigation or sunburn are perfect for the growth and the enhance of *Trichoderma asperellum* when the suitable interval period needed for the areation of the soil is respected.







After the application in greenhouse crops, is it safe to enter inside immediately? Yes. Xedavir has NO greenhouse reentry time after treatment.

After the application on vegetable (ex. tomatoes), is it safe to eat? Xedavir has a 0-day preharvest interval so it is safe to eat fruits and vegetables exposed to Xedavir. Of course, all fruits and vegetables should be washed before eating.







In conclusion..... which are common mistakes made when using XEDAVIR?

Common mistakes include:

- 1) Applying Xedavir when disease is already a problem in your plants.
- 2) <u>Improper storage</u> of product or holding past the expiration date on the container.
- 3) Using Xedavir to control diseases that are NOT covered on the Xedavir label (ex. *Fusarium* spp.)

XEDAVIR







INCONTRO TECNICO

«XEDAVIR e *Trichoderma asperellum* **Presentazione**"

Rubi, Barcelona (Spagna), 24 settembre 2019