PARIS

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Stratégies de lutte intégrée contre les ravageurs du maïs: mise en pratique en Italie

VENETO AGRICOLTURA
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PROFILACTIC USE OF NEONICOTINOIDS AT MAIZE SOWING HAD AN IMPORTANT ROLE TO CAUSE HONEY BEE LOSSES CASES

PROFILACTIC USE OF INSECTICIDES IS STRONGLY AGAINST IPM PRINCIPLES THAT HAVE BECOME COMPULSORY SINCE THE FIRST OF JANUARY 2014 BASED ON DIRECTIVE 2009/128/CE

IPM ACCORDING DIRECTIVE 2009/128/CE

1) Treatment may be applied only once pest population levels have been estimated by means of **monitoring and development** models;

2) Treatment may then be carried out only where and when monitoring has found that levels are **above set economic thresholds**;

3) If economic thresholds are exceeded, **agronomic solutions**, mainly **rotation**, should be considered to avoid damage to maize crops;

4) If economic thresholds are exceeded and no agronomic solutions are available, **biological control** or physical treatment, or any other non-chemical pest control method, should be considered as a replacement for chemical treatment.

KEY QUESTION: IS IT POSSIBLE IPM IN MAIZE?

1) WHAT IS THE RISK LEVEL? ARE POPULATIONS LEVELS ABOVE THRESHOLDS EVERYWHERE AND THEN TREATMENTS NEEDED ON ALL FIELDS OR ON FEW OF THEM?

2) ARE IPM STRATEGIES (MONITORING METHODS, RISK ASSESSMENT, TRESHOLDS FOR KEY PESTS, AGRONOMIC AND/OR BIOLOGICAL ALTERNATIVES) AVAILABLE?

MAIN PESTS

1. **SOIL PESTS, SPECIES HARMFUL AT EARLY MAIZE STAGES**

2. **PESTS HARMFUL TO DEVELOPED MAIZE (ECB, HELICOVERPA, ……) NEXT CONFERENCE!!**

1. PESTS AT EARLY STAGES

VIRUSES TRANSMITTED BY INSECTS

Neonics effective but diseases have low incidence, hybrids are usually resistant – resistant hybrids as effective as neonicotinoids

Furlan L, Chiarini F, Balconi C, Lanzanova C, Torri A., Valoti P, Alma A, Saladini MA, Mori N, Davanzo M, Colauzzi M (2012) Possibilità di applicazione della difesa integrata per il controllo delle virosi nella coltura del mais, Apoidea, 1-2, 39 – 44.

OTHER ANIMALS

Other solutions

INSECTS AND OTHER ARTHROPODS

1. PESTS AT EARLY STAGES: insects and other arthropods

A. BLACKCUTWORMS

B. (WCR) DIABROTICA

C. WIREWORMS

D. OTHER SOIL PESTS, e.g diplopods,..

(low incidence in italy and France)

A. BLACKCUTWORMS (A. ipsilon)

- **OCCASIONAL ATTACKS** (last significant outbreaks 1971, 1983)
- **LOW ECONOMIC DAMAGE**
- **ATTACKS NOT PREDICTABLE at sowing**
- **NEGLIGIBLE CONTROL BY SOIL INSECTICIDES (ALSO AS SEED COATING) WHEN NEEDED**
- **ALERT PROGRAMME PREDICTS WHERE AND WHEN POST-EMERGENCE TREATMENTS ARE NEEDED**

UNJUSTIFIED AT SOWING TREATMENTS

A. BLACKCUTWORMS - IPM

BLACKCUTWOM ALERT PROGRAM
(evaluation of southern winds, assessment of moth arrival with pheromone traps, prediction of formation of harfmul instars by a development model)

BULLETIN TO INFORM ABOUT POPULATION DEVELOPMENT

POSSIBLE FOLIAR TREATMENTS WHEN FOURTH INSTAR FORMS AND WE HAVE AN EARLY ATTACK ABOVE THRESHOLD (5% OF DAMAGED PLANTS)

UNJUSTIFIED AT SOWING TREATMENTS

A. BLACKCUTWORMS KEY QUESTION: IS IT POSSIBLE IPM?

1) WHAT IS THE RISK LEVEL? LOW, < 1%

2) ARE IPM STRATEGIES (MONITORING METHODS, RISK ASSESSMENT, TRESHOLDS FOR KEY PESTS) AVAILABLE? YES, BLACKCUTWORM ALERT PROGRAMME RUNNING SINCE 1991 IN ITALY WITH HIGH PRECISION

B. WCR - DIABROTICA

- POPULATIONS BELOW ECONOMIC THRESHOLD IN MOST OF THE EUROPEAN MAIZE FIELDS
- ROTATION THE ONLY FULL EFFECTIVE STRATEGY (provisions of directive 128/2009/CE give solution)
- ROTATION MAY BE EFFECTIVE EVEN AS “SOFT” MODALITY (1 YEAR OUT OF 2 OR MORE YEARS IF IMPLEMENTED AT LARGE SCALE
- AVAILABLE SOLUTIONS FOR ROTATION THAT DO NOT REDUCE GROSS MARGIN OF LIVESTOCK/BIOGAS FARMS
- TREATMENTS AT SOWING DO NOT SIGNIFICANTLY AFFECT WCR POPULATION DYNAMICS
- POSSIBILITY OF INSECTICIDE FAILURE WHEN POPULATIONS ARE REALLY HIGH

> CASES UNJUSTIFIED AT SOWING TREATMENTS

THRESHOLD 6 beetles/trap/day over a 3 – 6 week period

B. WCR - diabrotica KEY QUESTION: IS IT POSSIBLE IPM?

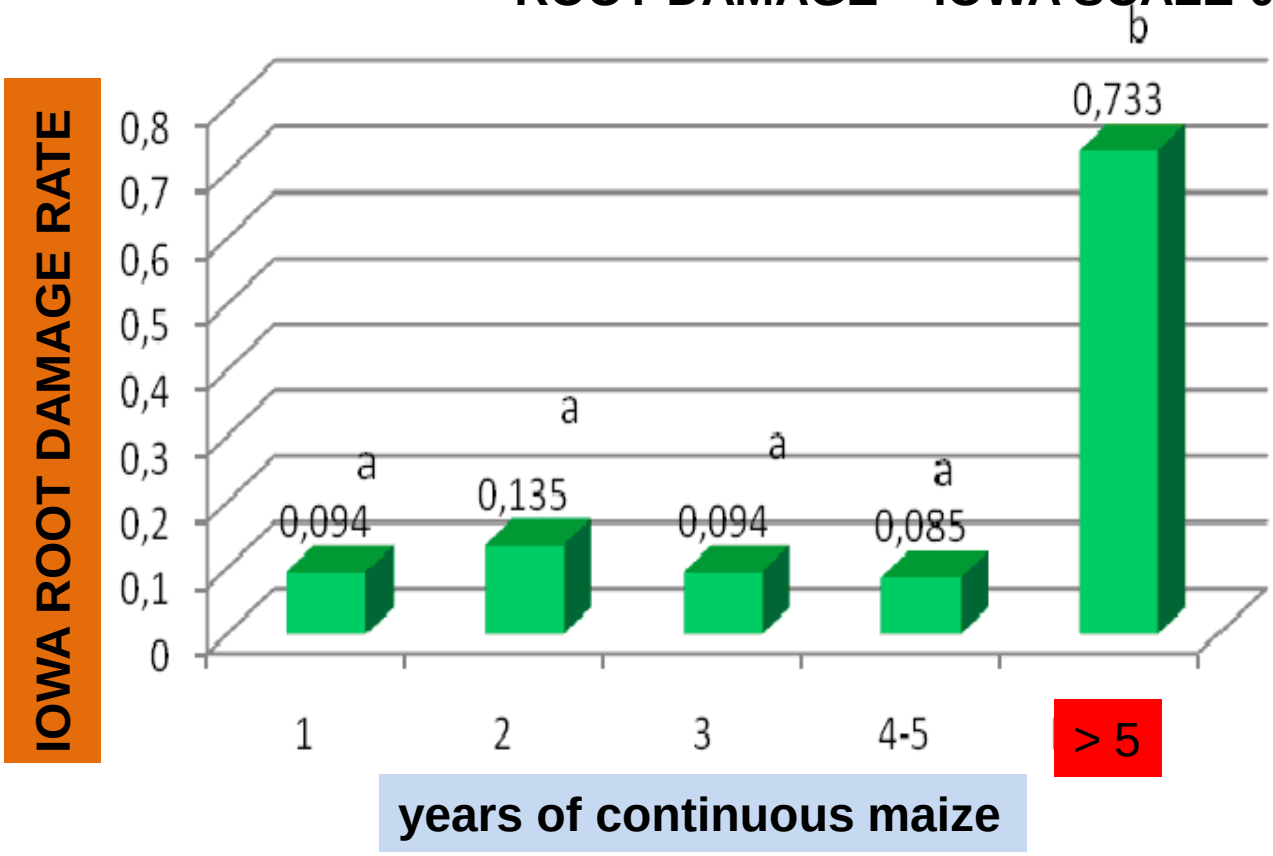
1) **WHAT IS THE RISK LEVEL? LOW**

2) **ARE IPM STRATEGIES (MONITORING METHODS, RISK ASSESSMENT, TRESHOLDS FOR KEY PESTS, AGRONOMIC (first of all rotation) – NON CHEMICAL SOLUTIONS,…..) AVAILABLE?**

It can be kept below economic threshold by rotation - rotation is the first option for IPM based on directive 2009/128/CE IPM OF DIABROTICA ONLY MEANS THE IMPLEMENTATION OF RATIONAL ROTATION WITHOUT ANY CHEMICAL TREATMENTS (AT SOWING OR LATER AGAINST BEETLES)

B. WCR - DIABROTICA

ROOT DAMAGE – IOWA SCALE 0 -3



Assessments 2012-2013 in areas with high WCR populations Vicenza and Treviso provinces in Veneto (North East Italy)

1= maize just after 1 year of continuous maize interruption

2= second year of maize after 1 year interruption and so on

B. WCR - DIABROTICA IPM ACCORDING DIRECTIVE 2009/128/CE

1) Treatment may be applied only once pest population levels have been estimated by means of **monitoring and development** models; AVAILABLE

2) Treatment may then be carried out only where and when monitoring has found that levels are **above set economic thresholds**;AVAILABLE

3) If economic thresholds are exceeded, **agronomic solutions**, mainly **rotation (the only fully effective, low impact strategy)**, should be considered to avoid damage to maize crops; AVAILABLE

4) If economic thresholds are exceeded and no agronomic solutions are available, **biological control also** AVAILABLE (nematodes) or physical treatment, or any other non-chemical pest control method, should be considered as a replacement for chemical treatment.

B. WCR - diabrotica KEY QUESTION: IS IT POSSIBLE IPM?

1) **WHAT IS THE RISK LEVEL? LOW**

2) **ARE IPM STRATEGIES (MONITORING METHODS, RISK ASSESSMENT, TRESHOLDS FOR KEY PESTS, AGRONOMIC (first of all rotation) – NON CHEMICAL SOLUTIONS,…..) AVAILABLE?**

It can be kept below economic threshold by "soft" rotation - rotation is the first option for IPM

based on directive 2009/128/CE IPM OF DIABROTICA ONLY MEANS THE IMPLEMENTATION OF RATIONAL ROTATION WITHOUT ANY CHEMICAL TREATMENTS (AT SOWING OR LATER AGAINST BEETLES)

C. WIREWORMS

THE ITALIAN CASE

DAMAGED FIELDS BY WIREWORMS
(over 30 years observations in Italy)

- visible damage (plants with attack symptoms easily found, more than 5% of damaged plants): < 5,0 %
- high damage (>30% of damaged plants): **< 1,0 %**
- sure economic damage (significant yield reduction) **<0,1%**

C. WIREWORMS (Apenet 2010 – a big survey in Po Valley)

ITALIAN REGIONS	MONITORED FIELDS	WITH RISK FACTORS (*A.brevis, A.sordidus*)	WITH RISK FACTORS (*A.litigiosus, A.ustulatus*)	*A. brevis* mean (e.s., min-max)	*A. sordidus* mean (e.s., min-max)	*A. litigiosus* mean(e.s., min-max)	*A. ustulatus* mean (e.s., min-max)	STAND pp/m^2 HEALTHY (*mean, min, max*)	sane % of heakthy plants out of total sown seeds)	by wireworms % of emerged plants (mean, min, max)	damage on plants – no economic damage (up to 10% of damged plants) (n°)	Fields with economic damage
VENETO	51	6	6	76 (18,3, 0,0- 691)	523 (53,1, 91-2129)	n.r.	548 (88,4, 0,00- 2786,00)	6,46 (0,07, 5,30-7,38)	90,3	1,14 (0,024, 0,0- 7,0)	2	0
EMILIA ROMAGNA	105	7	4	n.r.	245 (26,44, 4,00- 2201)	253 (24,3, 6,0- 1141)	n.r.	n.r.	n.r.	n.r.	1	0
LOMBARDIA	10	2	1	n.r.	983 (244, 189 - 2349)	629 (202, 63- 2087)	n.r.	6,48 (0,06, 4,80 - 7,3)	93,2	0,17 (0,071, 0,10- 0,81)	1	0
PIEMONTE	6	1	0	n.r.	1091 (290, 123- 2311)	243 (52, 46-549)	n.r.	7,00 (0,12, 6,40- 7,40)	94,6	5,8 (0,017, 0-12)	1	0
FRIULI	11	2	0	169 (19,7, 86 - 323)	335 (66,6, 59-763)	12 (6,41, 0,00- 52,0)	n.r.	6,63 (0,05, 6,35 - 6,90)	90,7	0,059 (0,01, 0,05- 0,1)	0	0
TOTAL	183	18	11								5	0
(%)											2,7	0

C. WIREWORMS
WHAT ABOUT THE OTHER MEMBER STATES?

PURE PROJECT (SEVENTH FRAMEWORK PROGRAMME) 2011 - 2012

- 3 on-stations experiments - FRANCE, HUNGARY, ITALY (long-term) to investigate different

- 15 on farm experiments (FRANCE, GERMANY, HUNGARY, ITALY, SLOVENIA)

The experiments (15) were carried out at:

1) Southern climatic conditions – Italy (5 locations) and France (2 locations)
2) Central climatic conditions - Germany (2 locations)
3) Eastern climatic conditions – Hungary (4 locations) and Slovenia (2 locations)

• On-farm experiments were managed with commercially available equipment

31 experiments in 2 years
Whole untreated fields/plots or alternated treated/untreated strips
NO ECONOMIC WIREWORM DAMAGE!!!!!!!

AVAILABLE TOOLS FOR IPM

A) RISK FACTORS
B) PHEROMONE TRAPS
C) BAIT TRAPS
D) AGRONOMIC STRATEGIES
E) BIOCIDAL PLANTS AND MEALS
F) OTHER BIOLOGICAL TREATMENTS

PLANTING CROPS WHERE AND WHEN THERE IS NO SERIOUS ECONOMIC DAMAGE RISK

AREA-WIDE LEVEL

A) AGRONOMIC RISK FACTORS

1. CONTINUOUS PLANT COVER (meadow, double crops as rye grass-maize, oilseed rape-soybean,…;
2. PEAT SOILS (high organic matter content)
3. PREVIOUS DAMAGE
4. (high beetle captures with Yf and/ or high incidence of uncultivated zones like grasses, forest,….)
5. IRRIGATION (continuous supply of water keeping high soil moisture)

AREA-WIDE LEVEL

B) PHEROMONE TRAPS YATLORf

- RELIABLE (NON SATURABLE)
- FEW INSPECTIONS
- EASY, QUICK MANAGEMENT
- LOW COSTS
- MULTIBAITED (MORE SPECIES MONITORED AT THE SAME TIME BY ONE TRAP)

C) BAIT TRAPS FOR COMPLEMENTARY LIMITED IN FIELD EVALUATION

a) IF AND WHERE THERE IS A POPULATION RISK OF ECONOMIC POPULATIONS PLACING BAIT TRAPS

b) EVALUATION OF LARVALTHRESHOLDS

wireworm species	wireworm catches (larvae/trap)	sampled fields	fields with yield reduction (maize)	%
Agriotes ustulatus	0-1	64	0	0,0
	1,01-2	7	0	0,0
	2,01-5	9	0	0,0
	5,01-10	**9**	**1**	**11,1**
	>10,01	**5**	**2**	**40,0**
Agriotes brevis	0-1	54	0	0,0
	1,01-2	**6**	**2**	**33,3**
	2,01-5	**7**	**4**	**57,1**
	> 5,01	**3**	**1**	**33,3**
Agriotes sordidus	0-1	113	0	0,0
	1,01-2	10	0	0,0

Furlan, L. (2014) IPM thresholds for *Agriotes* wireworm species in maize in Southern Europe. J Pest Sci , DOI 10.1007/s10340-014-0583-5.

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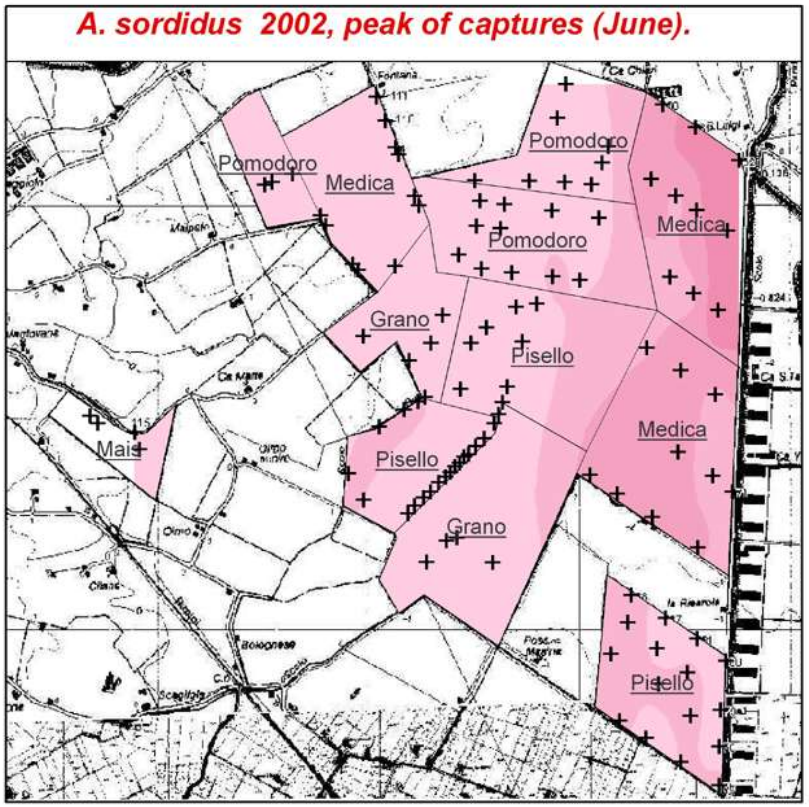
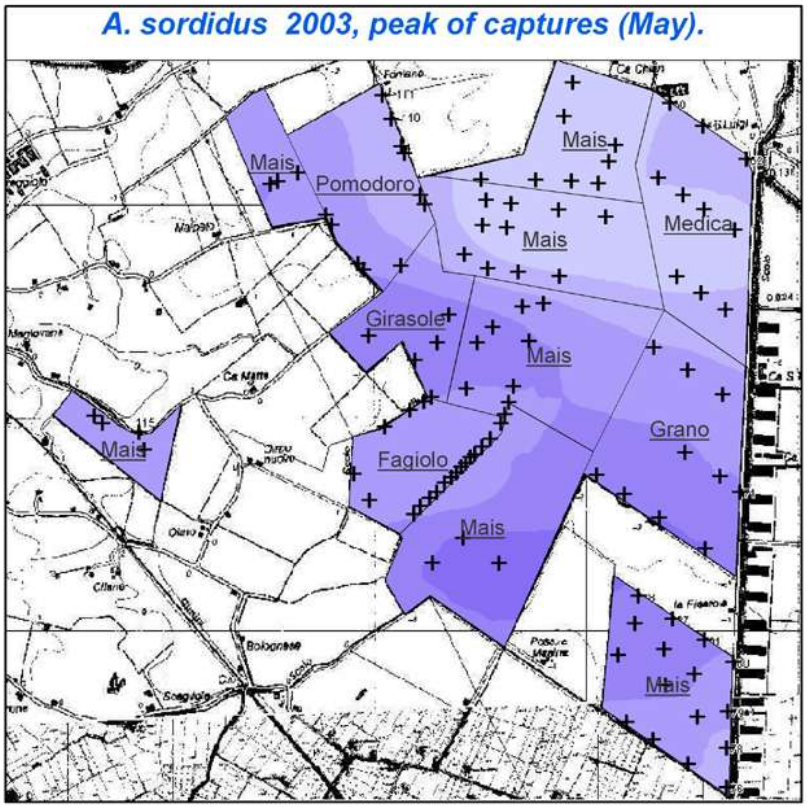
SPOTTING THE FIELDS AT RISK BY GEOSTATISTICS





BEFORE THE “BEES CASE”

BALANCED SAMPLE REPRESENTING MAIZE CONDITIONS IN PO VALLEY

- Different soils and rotations
- Different sowing timing
- Different seed densities and inter-row (75 cm - 45 cm)
- Typical cultivation techniques

SAMPLE CHARACTERISTCS

- low wireworm population fields: 40 - 60%
- medium wireworm population fields: 30 - 50%
- high wireworm population fields: 10 - 15%

- **large plots 300 – 1500 m ^{2}(m 3 – 4,5 X ..) randomized blocks**
- **2-8 replications**

- **Assessments**

- **stand at emergence**
- **damaged seedlings and plants**
- **stand at 4-6 leaves**
  damaged plants st. 4-8 leaves
- **plants damaged by other pests (aphids, viruses,…)**
- **yield**

TREATMENTS

- **1) NAKED Seeds – untreated : no insecticide or fungicide as seed treatments;**
- **2) FUNGICIDE: Metalaxil+fludioxonil (Celest®), a fungicide, at the rate of 100 ml/q of seed;**
- **3) Imidacloprid (Gaucho®), an insecticide: at the rate of 1,2 mg a.i./seed;**
- **4) Fipronil (Regent® TS), an insecticide: at the rate of 0,6 mg a.i./seed;**
- **5) Thiametoxam (Cruiser®), an insecticide: at the rate of 0,63 or 1,25 mg a.i./seed;**
- **6) Thiametoxam+tefluthrin rate (Powered by Cruiser & Force), both insecticides: thiametoxam at the rate of 1,00 mg a.i./seed + tefluthrin at the rate of 0,4 mg a.i./seed;**
- **7) Clothiadinin (Poncho®), an insecticide at the rate of 1,25 mg a.i./seed.**

MORE THAN 60 FIELDS AND MORE THAN 1000 PLOTS

2003 – 2006

FURLAN L., CANZI S., TOFFOLETTO R., DI BERNARDO A. (2007) Effetti sul mais della concia insetticida del seme (Effects on maize of insecticide seed coating). L'Informatore Agrario, 5, 92 -96. .

	(healthy plants/m²)		damaged plants		YIELD
	emergence	4-6 leaves	pp/mq	%	t/ha (14%)
NAKED SEED	6,26ab	6,33a	0,148a	2,28	12,11a
FUNGICIDE	6,41b	6,58c	0,157a	2,32	12,43a
FUNGICIDE+CUISER	6,32ab	6,52bc	0,103a	1,56	12,22a
FUNGICIDE+REGENT	6,15a	6,38ab	0,087a	1,35	12,31a
FUNGICIDE+GAUCHO	6,25ab	6,44abc	0,069a	1,01	11,97a

26 fields - 504 plots (Hybrid Tevere)

Means followed by the same letter in a column are not significantly different (Tukey's HSD test, P< 0.05).

2007 -2008

FURLAN L., CACIAGLI P., CAUSIN R., DI BERNARDO A. (2009) Il seme di mais va protetto solo quando serve (Maize seeds have to be protected only when needed). L'Informatore Agrario, 5, 36 – 44.

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	(healthy plants/m$^{2)}$		Damaged plants		YIELD
	emergence	4-6 leaves	pl/m^2	%	t/ha (14%)
FUNGICIDE	5,63a	6,09ab	0,07bc	1,13	10,90a
FUNGICIDE+PONCHO 1,25	5,55a	6,08ab	0,00a	0,00	10,74a
FUNGICIDE + CRUISER 0,63	5,51a	6,21b	0,02ab	0,32	10,40a
FUNGICIDE+CRUISER 1,25	5,55a	6,13ab	0,01a	0,16	10,73a
FUNGICIDE+CRUISER+FORCE	5,45a	6,07c	0,01a	0,16	10,40a
NAKED SEED	5,36a	5,61a	0,08c	1,41	9,76a

11 fields - 264 plots (Hybrid DKC 6530)

Means followed by the same letter in a column are not significantly different (Tukey's HSD test, P< 0.05).

2009

CRA-MAC - Unità di Ricerca per la Maiscoltura - Bergamo

AVERAGE OF 17 TRIALS (Hybrid PR31N27)

Active ingredient (trade mark)	yiels (t/ha- 15.5% U.R.)	(U.R. %)	PLANT HEIGHT (cm)	EAR HEIGHT (cm)	% BROKEN PLANTS	% LODGED PLANTS
untreated	13,54	22.3	268	119	4.44	0.06
THIAMETHOXAM (CRUISER)	13,24	22.1	269	121	3.80	0.08
IMIDACLOPRID (GAUCHO)	13,37	22.1	267	121	5.25	0.19
CLOTHIANIDIN (Poncho)	13,67	22.1	271	121	5.28	0.06
FIPRONIL (Regent)	13,38	22.3	268	123	4.19	0.06
STATISTICS	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.

Balconi C, Mazzinelli G., Lanzanova C, Torri A., Valoti P, Motto M., Berardo N. (2011) Mais: secondo anno di sperimentazione agronomica nell'ambito del progetto Apenet, Apoidea, 1-2, 41 – 45.

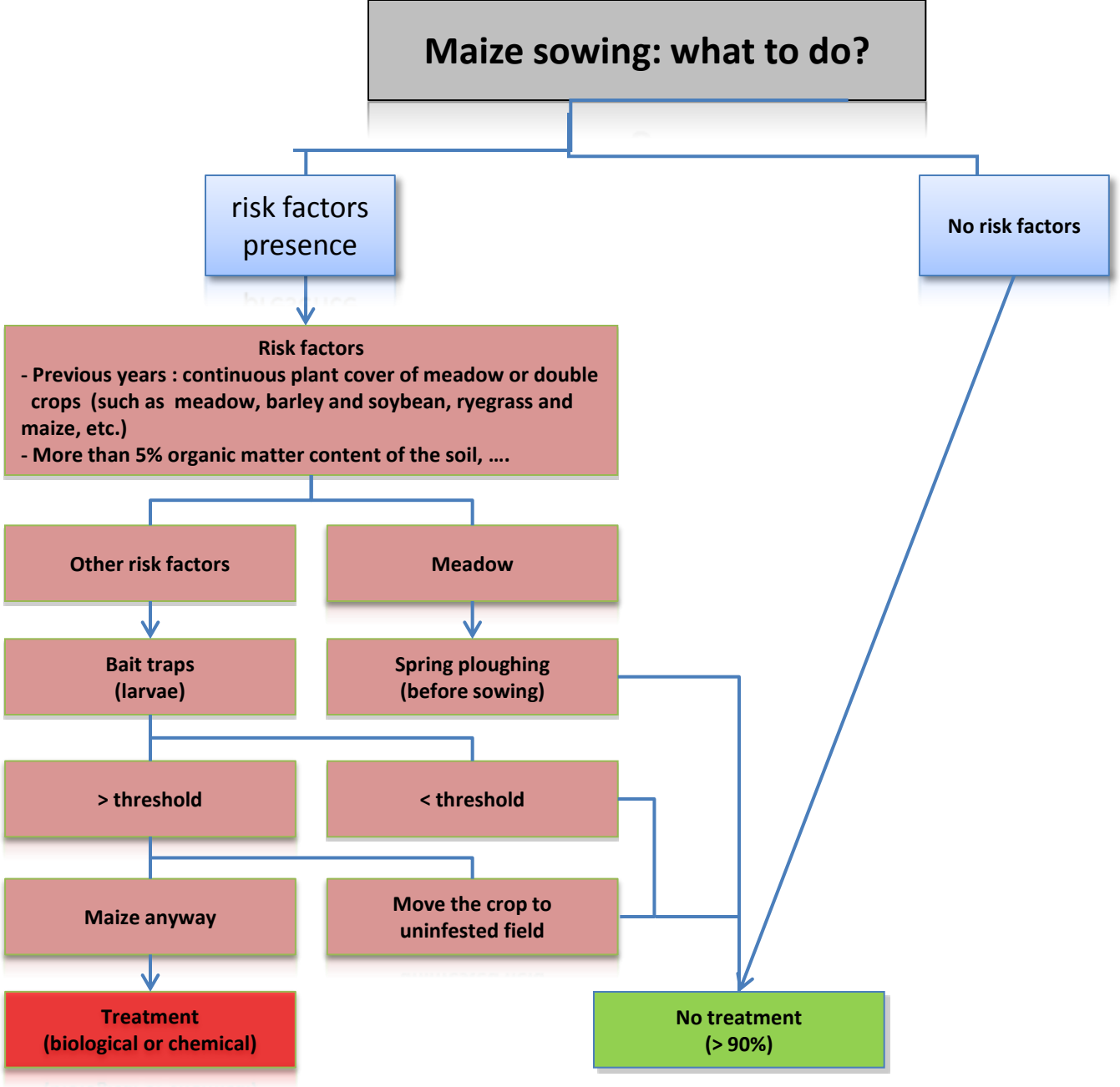
2010

CRA-MAC - Unità di Ricerca per la Maiscoltura - Bergamo

AVERAGE OF 19 TRIALS 2010 – hybrid PR32G44

Active ingredient (trade mark)	yiels (t/ha- 15.5% U.R.)	(U.R. %)	PLANT HEIGHT (cm)	EAR HEIGHT (cm)	% BROKEN PLANTS	% LODGED PLANTS
untreated	13,21	23.59	260.1	129.3	8.11	5.12
THIAMETHOXAM (CRUISER)	13,49	23.50	260.6	129.4	6.83	5.92
IMIDACLOPRID (GAUCHO)	13,46	23.29	262.2	129.6	7.78	4.14
CLOTHIANIDIN (Poncho)	13,82	23.28	264.7	131.7	7.05	5.03
FIPRONIL (Regent)	13,60	23.48	262.7	131.9	8.04	5.25
STATISTICS	N.S.	N.S.	N.S.	N.S.	N.S.	N.S.

Balconi C, Mazzinelli G., Lanzanova C, Torri A., Valoti P, Motto M., Berardo N. (2011) Mais: secondo anno di sperimentazione agronomica nell'ambito del progetto Apenet, Apoidea, 1-2, 41 – 45.


Maize sowing: what to do?
risk factors presence
No risk factors
Risk factors
- Previous years : continuous plant cover of meadow or double crops (such as meadow, barley and soybean, ryegrass and maize, etc.)
- More than 5% organic matter content of the soil, ….
Other risk factors
Meadow
Bait traps (larvae)
Spring ploughing (before sowing)
> threshold
< threshold
Maize anyway
Move the crop to uninfested field
Treatment (biological or chemical)
No treatment (> 90%)

C. WIREWORMS KEY QUESTION: IS IT POSSIBLE IPM?

1) **WHAT IS THE RISK LEVEL? LOW**

2) **ARE IPM STRATEGIES (MONITORING METHODS, RISK ASSESSMENT, TRESHOLDS FOR KEY PESTS, AGRONOMIC (first of all rotation) – NON CHEMICAL SOLUTIONS,…..) AVAILABLE?**

Yes, and MUTUAL FUNDS may allow a rapid implementation of IPM

A NEW "INSURANCE" APPROACH

MUTUAL FUNDS INSTEAD OF INSECTICIDES TREATMENTS

IF THE RISK IS LOW THE INSURANCE APPROACH IS CONVENIENT AND MUCH SAFER FOR PEOPLE ENVIRONMENT (INCLUDING BEES)

MUTUAL FUNDS TO ALLOW RAPID AND EFFECTIVE IPM IMPLEMENTATION

RISKS COVERED	• Insufficient plant density (stand) because of adverse climatic conditions (namely drought, flooding, freezing cold) • insufficient plant density (stand) because of soil pests (such as wirewormss, blackcutworms,…) or diseases such as Fusarium spp. (rotten roots,, seedlings)
TARGET	Members of farmer sconsortium
OBLIGATIONS	• contract to be signed before sowing; • Implementation of good cultivation practices; • Implementation of provisions of Directive 128/2009/CE); • Connection and implementation of suggestions of Bullettin of Arablecrops”
COSTS	25€/ha all inclusive (including flooding (rain excess,) freezing cold, drought); pest risk alone is covered with less than 15 €/ha
COMPENSATIONS	UP TO 700€ /ha including: • Resowing (up to 200€/ha) if stand below 4 pls/m^2 • Yield reduction (up to 500€/ha) based on sowing delay, crop change, ...
COMPENSATION LIMITS	ACCORDING TO FARM SIZE: • up to 10 ha limit 2.000€; • Between 11 and 20 ha: 4.000 € • >20 ha : 10 times total cost or 50.000 €

ADVANTAGES OF MUTUAL FUNDS

1) Reduction of costs/ha;

2) Coverage of risks due to mistakes or difficulties in IPM implementation (e.g. delay in blackcutworm treatments)

3) Coverage of other risks such as flooding, drought not covered by insecticides;

4) Reduction of health risk for farmers since they will not get in touch with insecticides at all;

5) Avoidance of negative impact of insecticides on soil beneficials;

6) Avoidance of pollution risks for soils and water tables;

ADVANTAGES OF MUTUAL FUNDS (2)

7) Avoidance of risks for bees and other wild pollinators; more generally reduction of risks for fauna;

8) Risk coverage with any climatic conditions while soil insecticides may fail (Furlan *et al*. 2011, Ferro e Furlan, 2012, Furlan et al. 2014)

Furlan L., Benevegnu' I, Cecchin A., Chiarini F., Fracasso F., Sartori A., Manfredi V, Frigimelica G., Davanzo M., Canzi S., Sartori E., Codato F., Bin O., Nadal V., Giacomel D, Contiero B (2014) Difesa integrata del mais: come applicarla in campo. L'Informatore Agrario, 9, Supplemento Difesa delle Colture, 11-14.

Furlan L., CAPPELLARI C., PORRINI C., RADEGHIERI P., FERRARI R., POZZATI M., DAVANZO M., CANZI S., SALADINI M.A., ALMA A., BALCONI C., STOCCO M. (2011) Difesa integrata del mais: come effettuarla nelle prime fasi. L'Informatore Agrario, 7, Supplemento Difesa delle Colture: 15 – 19.

Ferro G., Furlan L. (2012) Mais: strategie a confronto per contenere gli elateridi, 42, L'Informatore Agrario, 42, Supplemento Difesa delle Colture: 63 – 67.

IPM IN MAIZE

IPM IS THE MOST POWERFUL TOOL TO REDUCE RISKS FOR BEES, HUMAN AND ENVIRONMENTAL IMPACT OF MAIZE CULTIVATION ALSO IMPROVING FARMERS INCOMES

FINAL GOAL

INSECTICIDE TREATMENTS ON < 10% OF MAIZE FIELDS BY MEANS OF IMMEDIATE IPM IMPLEMENTATION

NO RISK FACTORS: NO TREATMENTS AT ALL - MUTUAL FUNDS to support first IPM phases or long term IPM implementation as well

PRESENCE OF RISK FACTORS : TREATMENTS where populations above economic thresholds are present - MUTUAL FUNDS to cover risk of IPM implementation mistakes, mainly in the first phase

WHAT CAN PUBLIC INSTITUTIONS DO TO MAKE EFFECTIVE IPM IMPLEMENTATION?

1) SUPPORT INDEPENDENT ADVISORY SYSTEM

2) GIVE CONTRIBUTIONS AND TECHNICAL SUPPORT TO MUTUAL FUNDS IN ORDER TO COVER IPM RISK

3) SUPPORT APPLIED RESEARCH FOR PRACTICAL SOLUTIONS AND INNOVATION DISSEMINATION

SOM E SUCCESSFUL CASE STUDIES

Az. Moizzi Luciana, Eraclea (VE)

Cultivated land ha 145
Reclaimed soil (1920, below sea level)
Silty loam soil, 2-3% organic matter

Conventional tillage
Rotation: winter wheat, maize, soybean
(small surface with sugar-beet, 10-15 ha, same fields every 10-12 years)

SOME SUCCESSFUL CASE STUDIES

Az. Moizzi Luciana, Eraclea (VE)

Monitoring from 1984 to 2014 each year

Soil sampling first years
bait traps (larvae) from 1992
PHEROMONE TRAPS traps (adults) from 1996

SOME SUCCESSFUL CASE STUDIES
Moizzi Italy RESULTS

***A. brevis*: negligible populations**

***A. litigiosus*: negligible populations**

***A. sordidus*: low populations (beetles < 300; larvae 0 to 0,2/tr)**

***A. ustulatus*: (10% of the surface with high beetle population > 1500 beetles/season); wireworm density above threshold in 3 years, totally 9 ha)**

SOME SUCCESSFUL CASE STUDIES
Moizzi Italy RESULTS

1.More 1500 maize hectares untreated (no soil insecticide use) 1984 - 2014

2. 9/1500 (0,60%) with economic populations (solution – replacement of maize with other crop)

3. Seed + plant damage always lower 5% (0,1 to 2,5% usually)

4. NO ECONOMIC DAMAGE: 96% fields high stand (> 90% of sown seeds)/Some cases of stand reduction (anyway > 5 pp/m^2) mainly because of bird damage

5. > 55.000 € saved, no threat to worker health, no environmental impact

VENETO AGRICOLTURA OPEN FARMS-OPEN PROTOCOLS

2009 – 2014
NO SOIL INSECTICIDES
600 Ha OF CULTIVATED LAND IN 6 YEARS
170 HA OF MAIZE x 6 YEARS
> 1000 ha of maize cultivation over 6 YEARS
NO ECONOMIC SOIL INSECTS DAMAGE

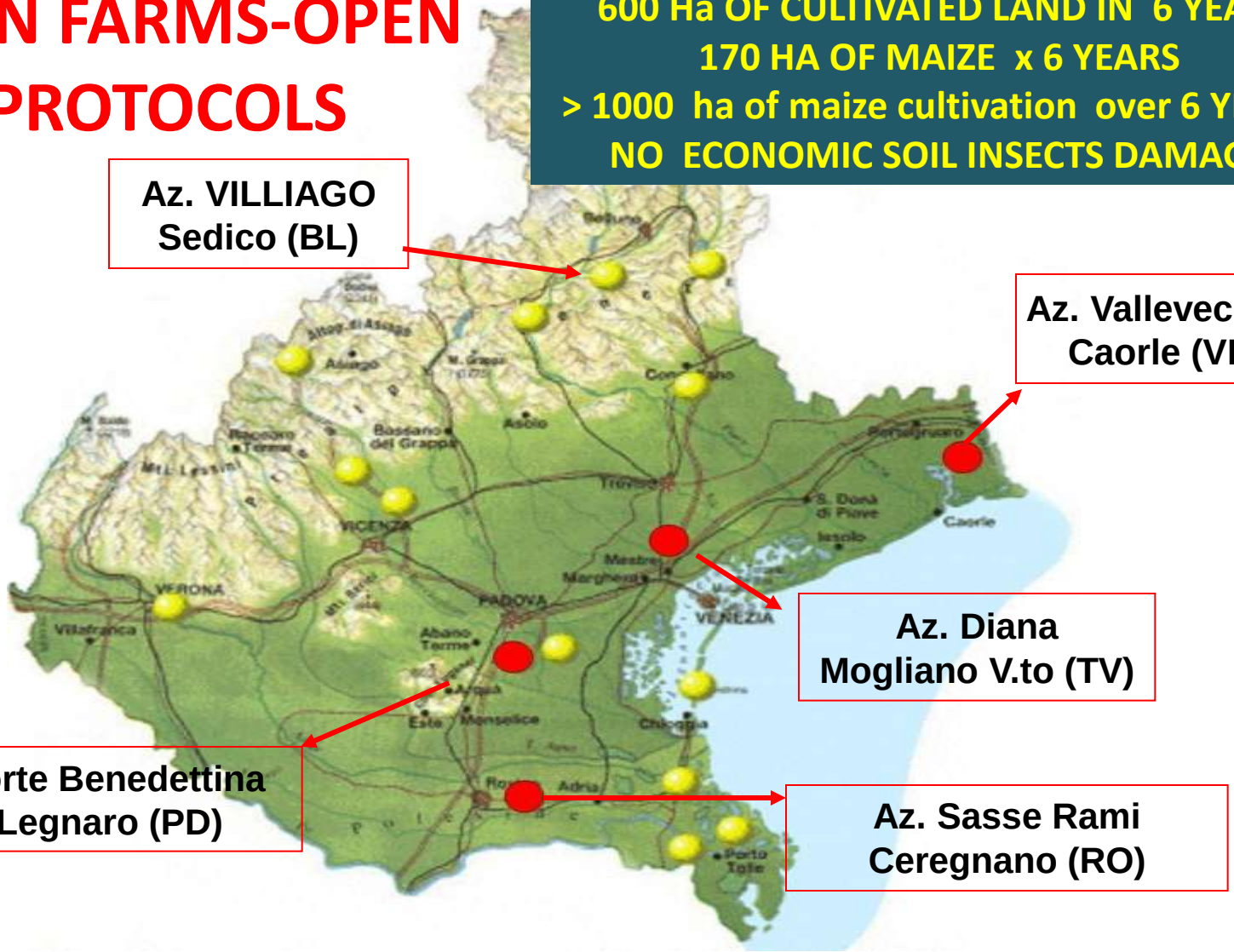
Az. VILLIAGO
Sedico (BL)

Az. Vallevecchia
Caorle (VE)

Az. Diana
Mogliano V.to (TV)

Corte Benedettina
Legnaro (PD)

Az. Sasse Rami
Ceregnano (RO)



HOW TO REACH FARMERS
"BULLETIN OF ARABLE CROPS"

MAIN FEATURES OF THE BULLETIN

flexibility, the cadence on average is at least weekly, but it varies according to the needs, since it is closely related to the evolution of crops and pests; the information is forwarded by e-mail and always available on the web-site (http://www.venetoagricoltura.org), while, in case of immediate risk, the alert is given also via SMS;

- **preparation: it gives a continuous information on how to react promptly and properly in case of alert message;**
- **formation: bulletins are designed in a way to provide in-depth information (e.g recognition of symptoms, pests);**
- **participation: the farmers can use monitoring tools;**
- **interaction: possibility to ask questions and to propose changes**