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FINAL CONFERECE

MODIFYING PLANTS TO PRODUCE INTERFERRING RNA

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- Encourage interactions of researchers across 34 European, nearby and international countries

www.***iplanta.univpm.it***.
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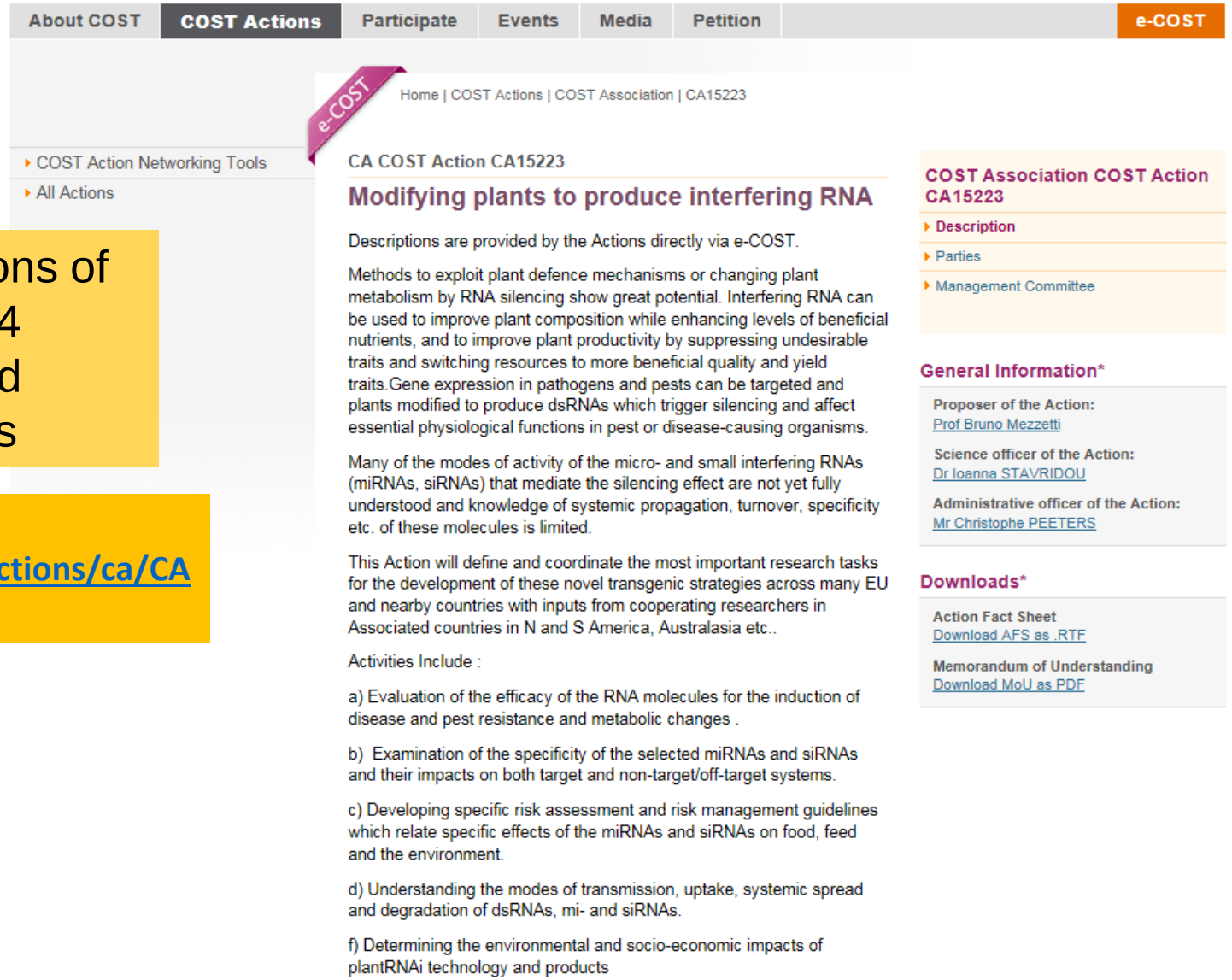

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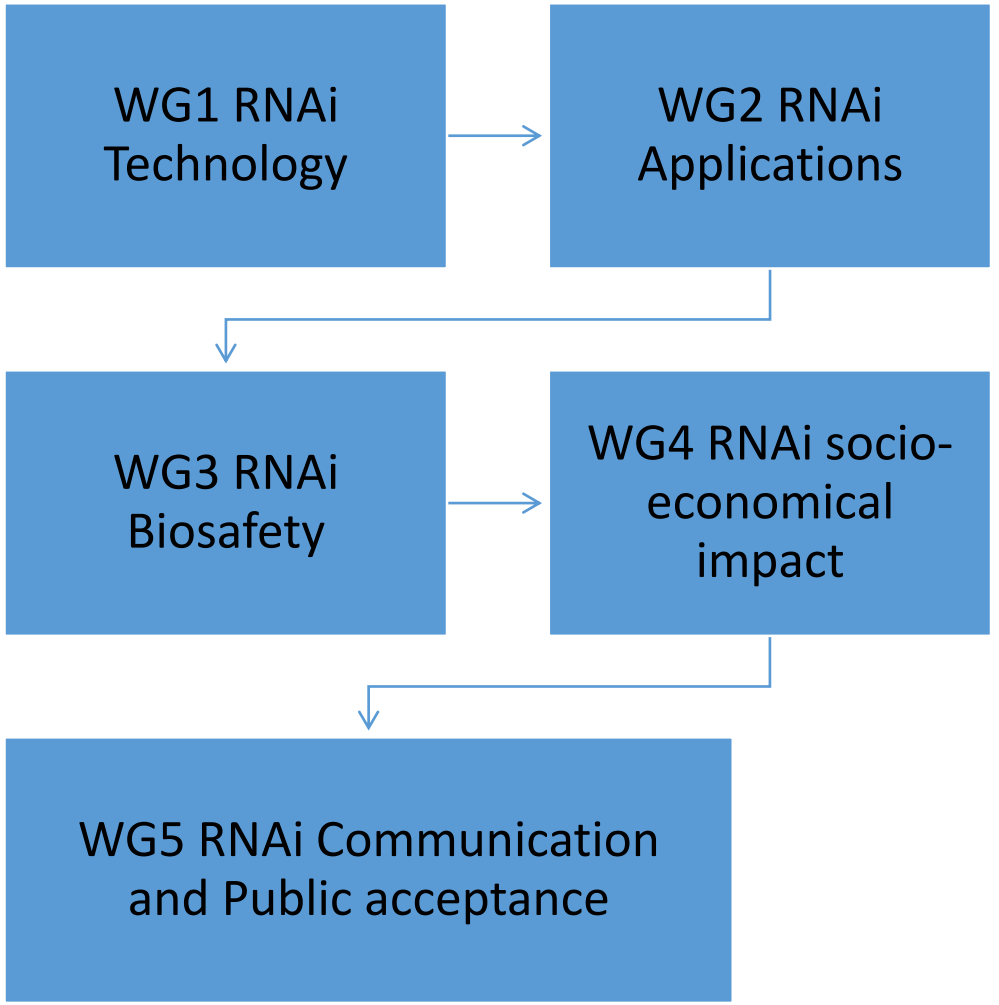
IPLANTA ORGANIZATION

- Define and promote the most important research tasks for the development of novel gene silencing strategies in Plants

- Focus on RNAi technology, applications, biosafety, socioeconomic and communication

- Runs from 2016 to 2020.

- More then 200 experts are already joining the network from 34 countries



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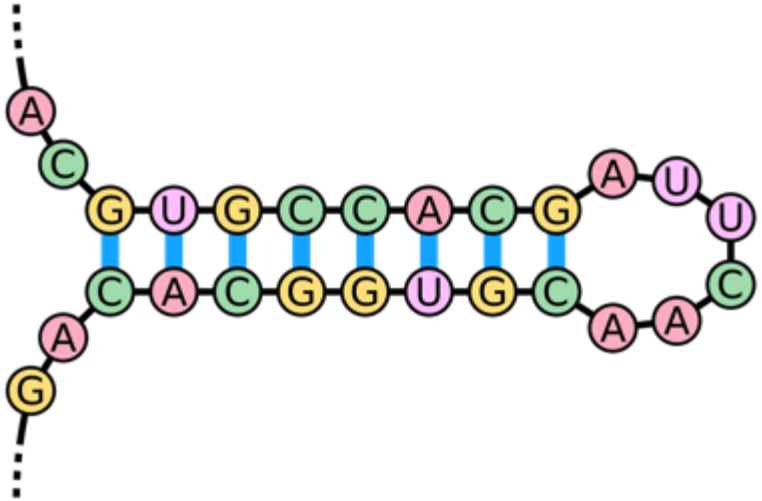
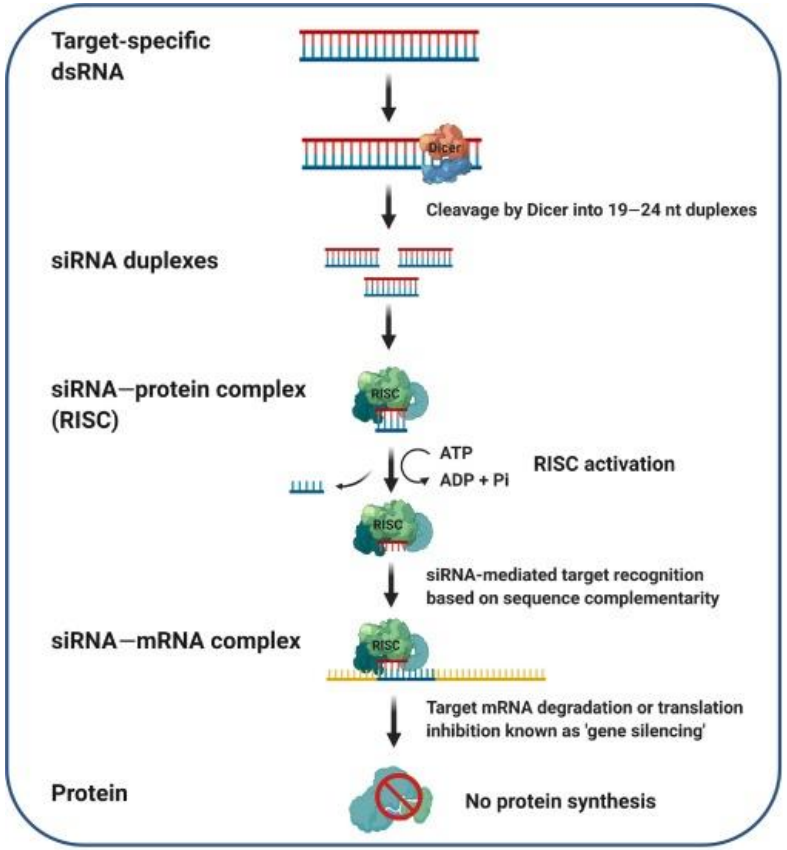
RNAi a natural mechanism

RNAi inhibits gene expression in a **sequence-specific manner** induced by **double strand RNA** (dsRNA)

Advantages of this natural molecule:
Cross talk
Mobility
Topical application





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Trends in Biotechnology

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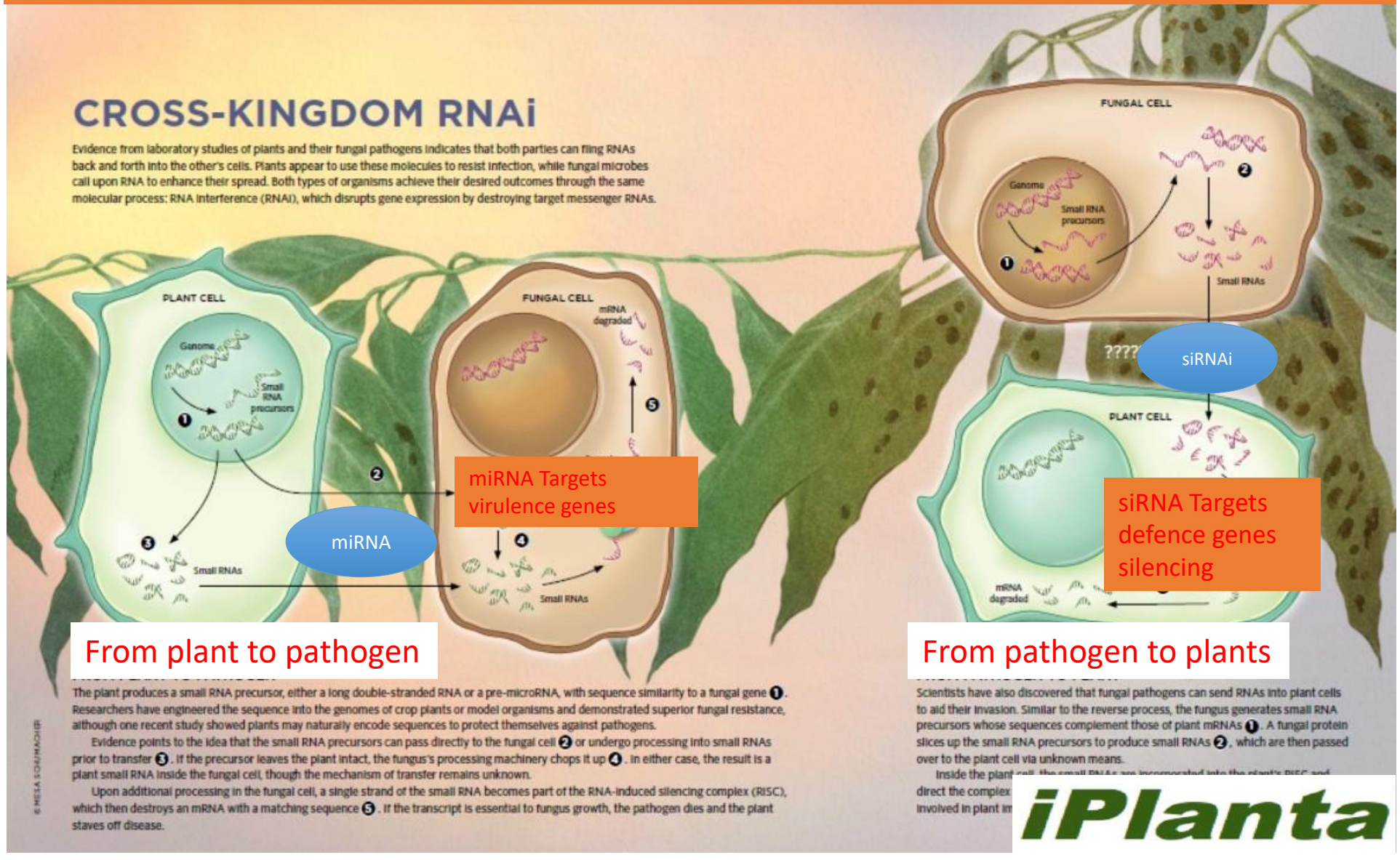
HOST-PATOGEN INTERACTION TO IDENTIFY GENES OF RESISTANCE, METHABOLITES AND RNA MOLECULES INDUCER OF RESISTENCE

Natural basis of RNAi-based crop protection

Bidirectional communication (Weiberg et al., 2013, Science)



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RNAi: A NATURAL MOLECULA TO BE APPLIED IN PLANTS

- **Direct delivery in the crop plant**

(Host induced Gene Silencing HIGS)*

Applications: a) Functional genomic studies,

b) improvement of important agronomic traits

- **Delivery via spray-application**

(Spray-Induced Gene Silencing, SIGS)**

Applications: Topical application to control pathogen and pests.

*Nowara et al. (2010) Plant Cell 22:3130
**Koch et al. (2016) PloS Pathogens

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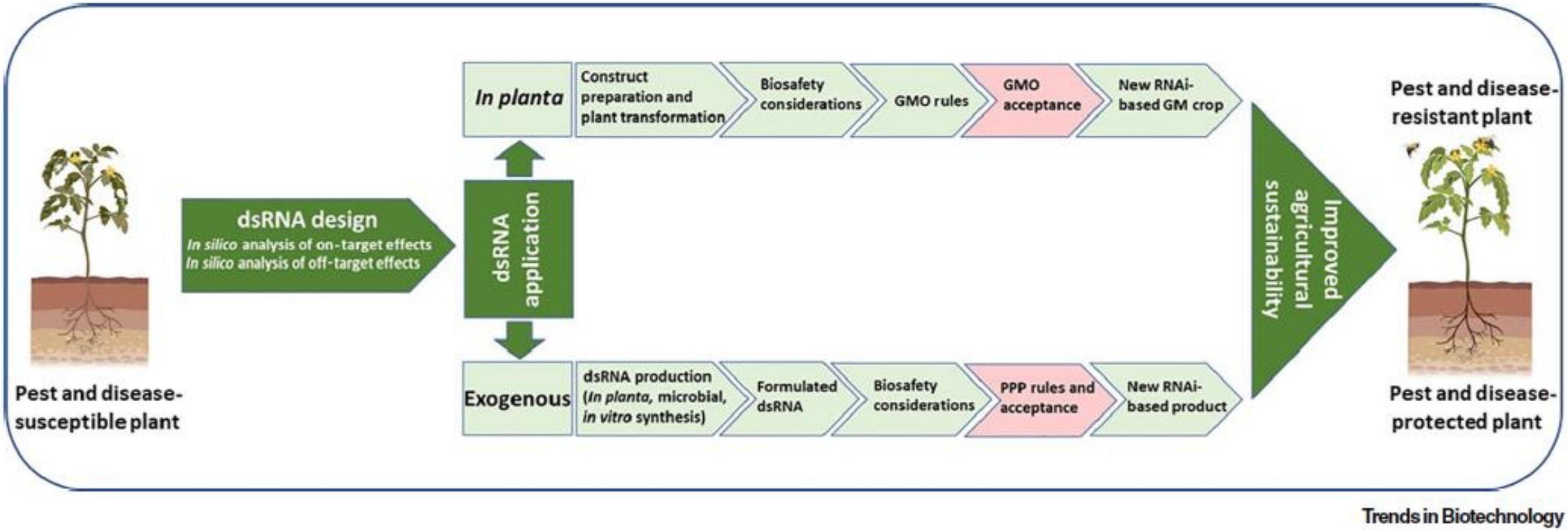
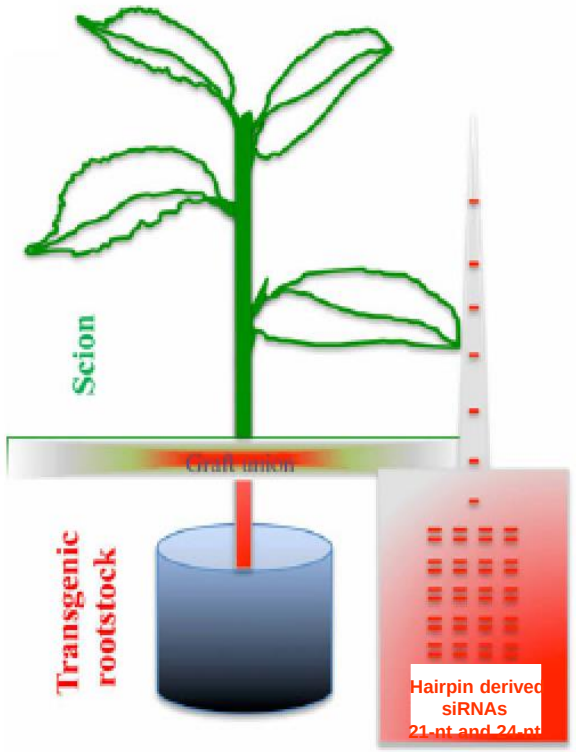


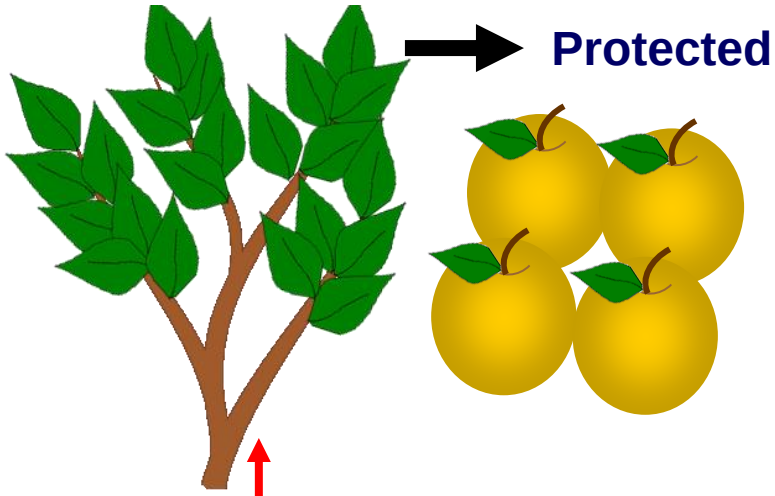
Figure 2. Two Main Delivery Approaches for RNAi-Based Control of Pests and Diseases. RNAi-based control typically starts with designing the double-

INDUCING RNAI PLANT RESISTANCE BY INDUCING RNAi PRODUCTION IN ROOTSTOCKS

HIGS

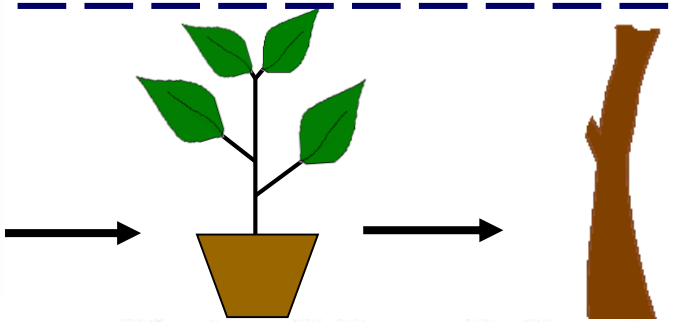


Susceptible scion



Protected fruits

Honeysweet transgenic resistant plum



Apply RNAi only to rootstock Transgenic plant

Introduce resistance to diseases

Advantages in the use of a silenced rootstock:

- The scion maintains its genetic inheritance.
- There is not gene flow because pollen and seed are not genetically modified.

PUBBLIC ACCEPTANCE

LOW ENVIRONMENTAL RISK

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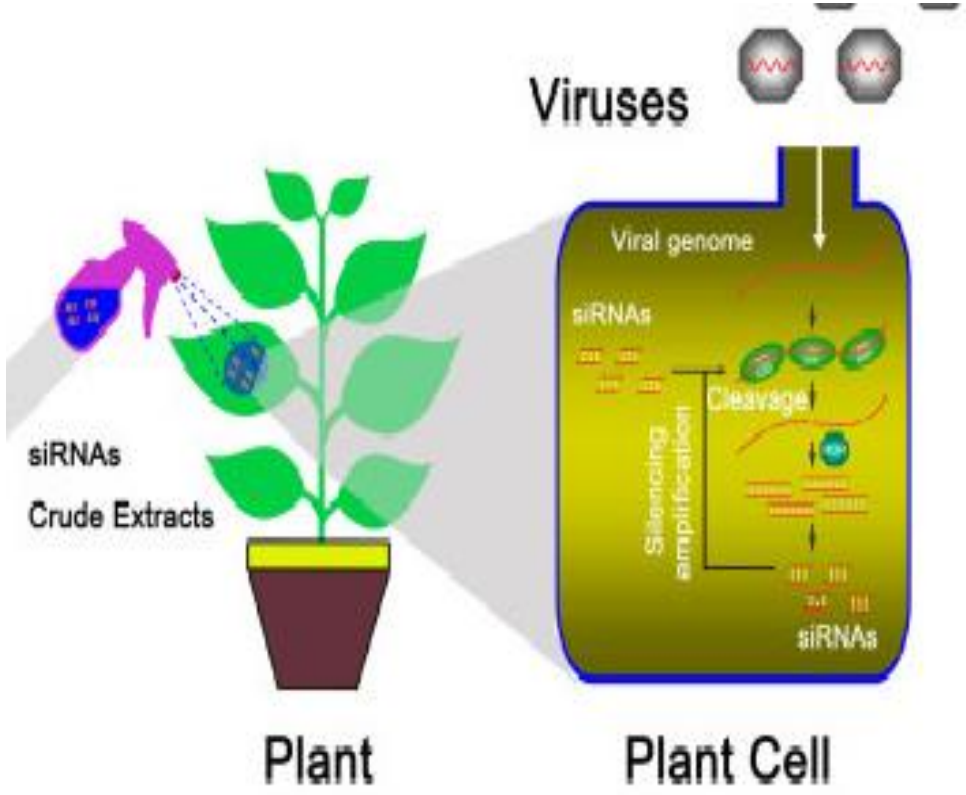
SIGS

Exogenous induction

3) Application of dsRNA on plant surface by spray.



Insect
Fungi
…
Contol fruit ripening

C. Duan, C. Wang and H. Guo (2012) Application of RNA silencing to plant disease resistance Silence 2012, 3:5.

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iPLANTA 4 years activities – and half year in COVID era
5 Grant periods

Grant Periods	WG Meetings	MC	CG	DM	Workshop	Conference	Training School	STSM's
GP1	1	1	1			1		
GP2	5	1	2	2		1	1	9
GP3	5	1	1	2	2	1	1	10
GP4	5	1				1	2	9
GP5	9	1				1		

iPLANTA : MC MEETING AND CONFERENCES

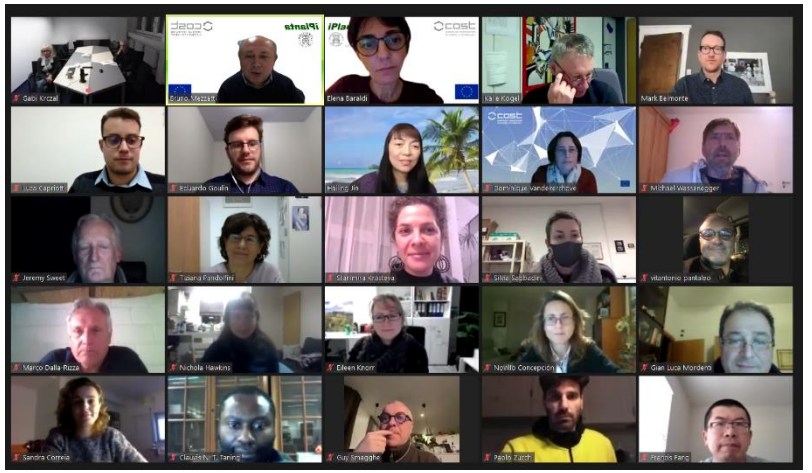
iPlanta	MC	Conference	Where
GP1	1	1	Rome
GP2	1	1	Poznan
GP3	1	1	Lisbon
GP4	1	1	Athens
GP5	1	1	virtual

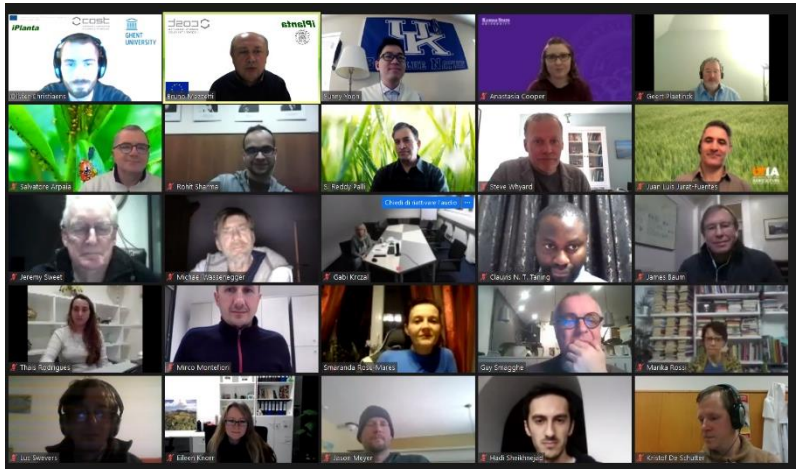
iPLANTA : TRAINING SCHOOLS

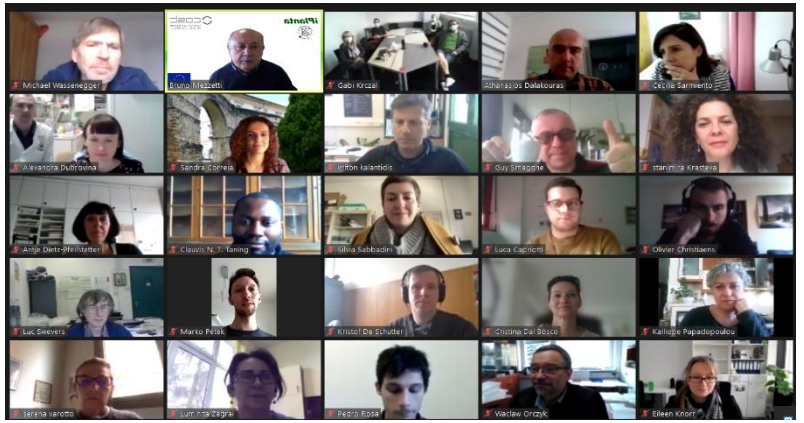
Training School	Trainee	Trainer	where
GP1			
GP2	11	4	Ancona (IT)
GP3	19		Rothamsted (UK)
GP4	6	6	Gent (BE)
GP4	13	4	Neustadt (GE)

iPLANTA : WEBINARS

Webinars	title	Date	N. people
1	Development of RNAi based pesticides: new opportunities and environmental biosafety considerations	01/12/20	247
2	RNAi based pesticides: Environmental biosafety issues	07/12/20	233
3	RNAi based pesticides: Regulation issues	14/12/20	169
4	Honey Sweet: a RNAi based PPV resistant plum.	28/01/21	145
5	RNAi-based control of fungal pathogens	09/02/21	220
6	RNAi strategy to control insect pests'	16/02/21	172
7	Comunication strategies on RNAi impacts in agriculture	23/02/21	173
8	The Contribution of RNAi for more sustainable and resilient food systems: Meeting with stakeholders and policymakers	04/03/21	127
9	RNAi plant epigenetics and development	04/03/21	105
10	Final conference	25/03/21	
11	Final management committee	26/05/21	







iPLANTA : INTERNATIONAL DISSEMINATION

Who	Where	When	What
Jeremy Sweet	Guadalajara- Mexico	giu-17	ISBGMO
Bruno Mezzetti	San Diego USA	gen-18	PAG
Salvatore Arpaia	Vancouver Canada	nov-18	Entomology Conference
Bruno Mezzetti	Orlando USA	feb-19	NASGA

iPLANTA : ITC CONFERENCE GRANTS

Dr Anna Coll Rius	12TH CONGRESS OF THE INTERNATIONAL PLANT MOLECULAR BIOLOGY	ago-18

iPLANTA : SCIENTIFIC DISSEMINATION

Trends in Biotechnology

Science & Society

Does RNAi-Based Technology Fit within EU Sustainability Goals?

Clauvis Nji Tizi Taning [1,*]
Bruno Mezzetti [2] Gijs Kleter [3]
Guy Smagghe [1] and
Elena Baraldi [4,*]

European Union (EU) and global sustainability policies emphasize the need to replace contentious pesticides with safe, efficient, and cost-effective alternatives to ensure sustainable food production. However, R&D for alternatives to contentious pesticides are lagging behind and need to be broadened. Here we no ris

Pest Management Science

Perspective | Full Access

RNA-based biocontrol compounds: current status and perspectives to reach the market

Clauvis NT Taning, Salvatore Arpaia, Olivier Christiaens, Antje Dietz-Pfeilstetter, Huw Jones, Bruno Mezzetti, Silvia Sabbadini, Hilde-Gunn Sorteberg, Jeremy Sweet, Vera Ventura, Guy Smagghe

First published: 19 November 2019 | https://doi.org/10.1002/ps.5686 | Citations: 20

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Rapid Communication | Open Access | Published: 26 May 2020

RNAi: What is its position in agriculture?

Bruno Mezzetti, Guy Smagghe, Salvatore Arpaia, Olivier Christiaens, Antje Dietz-Pfeilstetter, Huw Jones, Kaloyan Kostov, Silvia Sabbadini, Hilde-Gunn Opsahl-Sorteberg, Vera Ventura, Clauvis Nji Tizi Taning & Jeremy Sweet

Journal of Pest Science **93**, 1125–1130(2020) | Cite this article

4874 Accesses | **12** Citations | **24** Altmetric | Metrics

REVIEW ARTICLE

Front. Plant Sci., 24 June 2020 | https://doi.org/10.3389/fpls.2020.00940

Biosafety of GM Crop Plants Expressing dsRNA: Data Requirements and EU Regulator Considerations

Salvatore Arpaia[1*], Olivier Christiaens[2], Kara Giddings[3], Huw Jones[4], Bruno Mezzet
Moronta-Barrios[6], Joe N. Perry[7], Jeremy B. Sweet[8], Clauvis N. T. Taning[2], Guy Smaggh
Antje Dietz-Pfeilstetter[9]

[1]ENEA, Italian National Agency for New Technologies, Energy and Sustainable Economic Development, Rotondella, Italy

EXTERNAL SCIENTIFIC REPORT

APPROVED: 18 May 2018

Literature review of baseline information on RNAi to support the environmental risk assessment of RNAi-based GM plants

Olivier Christiaens[1], Teodora Dzhambazova[2], Kaloyan Kostov[2], Salvatore Arpaia[3], Mallikarjuna Reddy Joga[1], Isabella Urru[3], Jeremy Sweet[4], Guy Smagghe[1]

[1]Ghent University, Belgium
[2]Agrobioinstitute (ABI), Sofia, Bulgaria
[3]Italian National Agency for New Technologies, Energy and Sustainable Economic Development (ENEA), Italy
[4]JT Environmental Consultants Ltd, Cambridge, UK

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Genetic Transformation in Peach (*Prunus persica* L.): Challenges and Ways Forward

by Angela Ricci [1], Silvia Sabbadini [1], Humberto Prieto [2], Isabel MG Padilla [3], Chris Dardick [4], Zhijian Li [4], Ralph Scorza [5], Cecilia Limera [1], Bruno Mezzetti [1], Margarita Perez-Jimenez [6], Lorenzo Burgos [7] and Cesar Petri [8,*]

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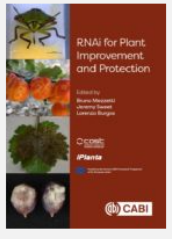

RNAi for Plant Improvement and Protection

Edited by: **Bruno Mezzetti**, Università Politecnica delle Marche, **Jeremy Sweet**, National Institute of Agricultural Botany (NIAB), Cambridge, UK, **Lorenzo Burgos**, CEBAS-CSIC, Spain

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iPLANTA : PUBLIC DISSEMINATION- MULTIMEDIA

GP3	MULTIMEDIA 1	Video introducing iPlanta - Rothamsted: https://www.youtube.com/watch?v=L_M7jdbbTMk
GP4	MULTIMEDIA 2	iPlanta press conference at the Senate of the italian Republic: https://www.youtube.com/watch?v=nUn5PGavwUA
GP5	MULTIMEDIA 3	iPlanta multimedia – Is RNAi Technology a green opportunity? https://www.youtube.com/watch?v=GPRyXVPsw38
GP5	MULTIMEDIA 4	iPlanta multimedia – summarizing major outputs from 9 scientific WEBINARS

iPLANTA : PUBBLIC DISSEMINATION

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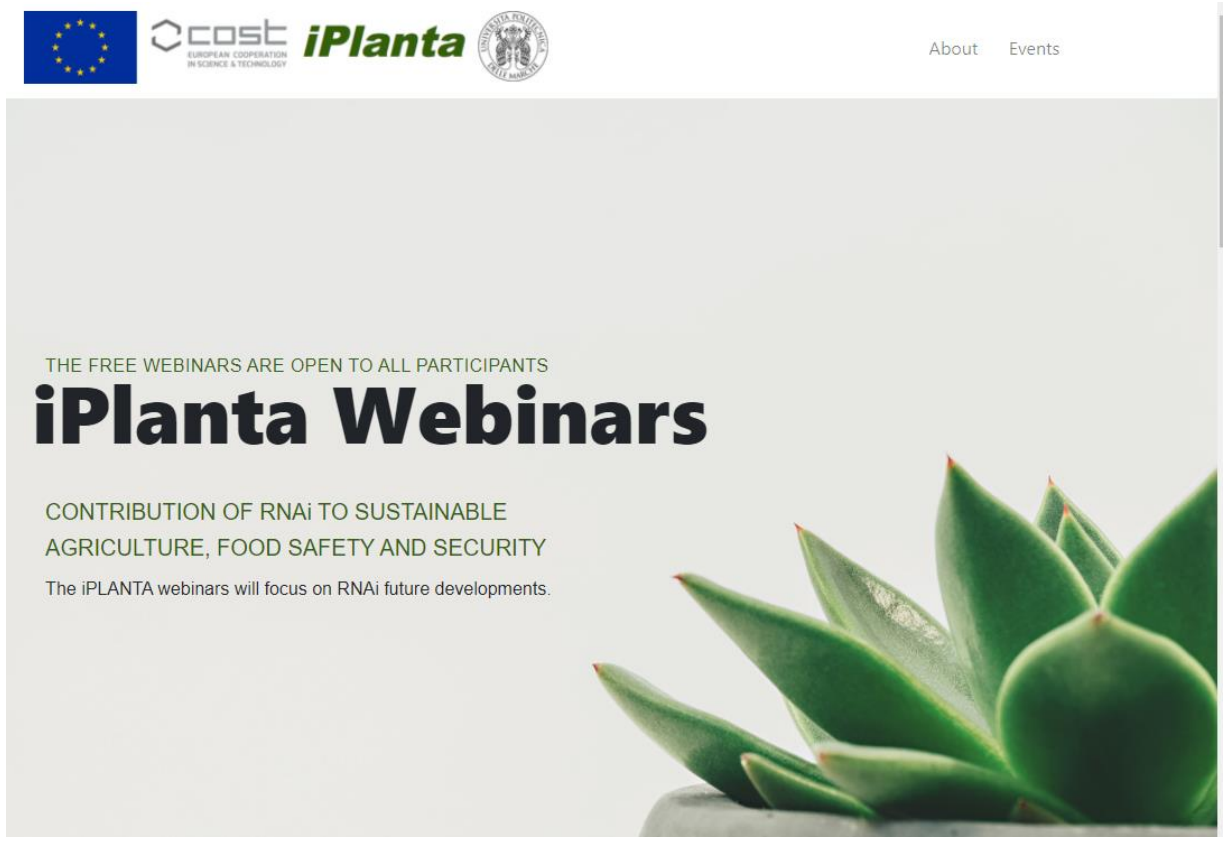
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