THE NECESSITY TO HAVE NATIONAL DRIFT CURVES: EXAMPLE OF DRIFT CURVES FOR VINEYARDS IN NORTHERN ITALY

Paolo Balsari, Paolo Marucco

DEIAFA – University of Torino Italy

paolo.balsari@unito.it

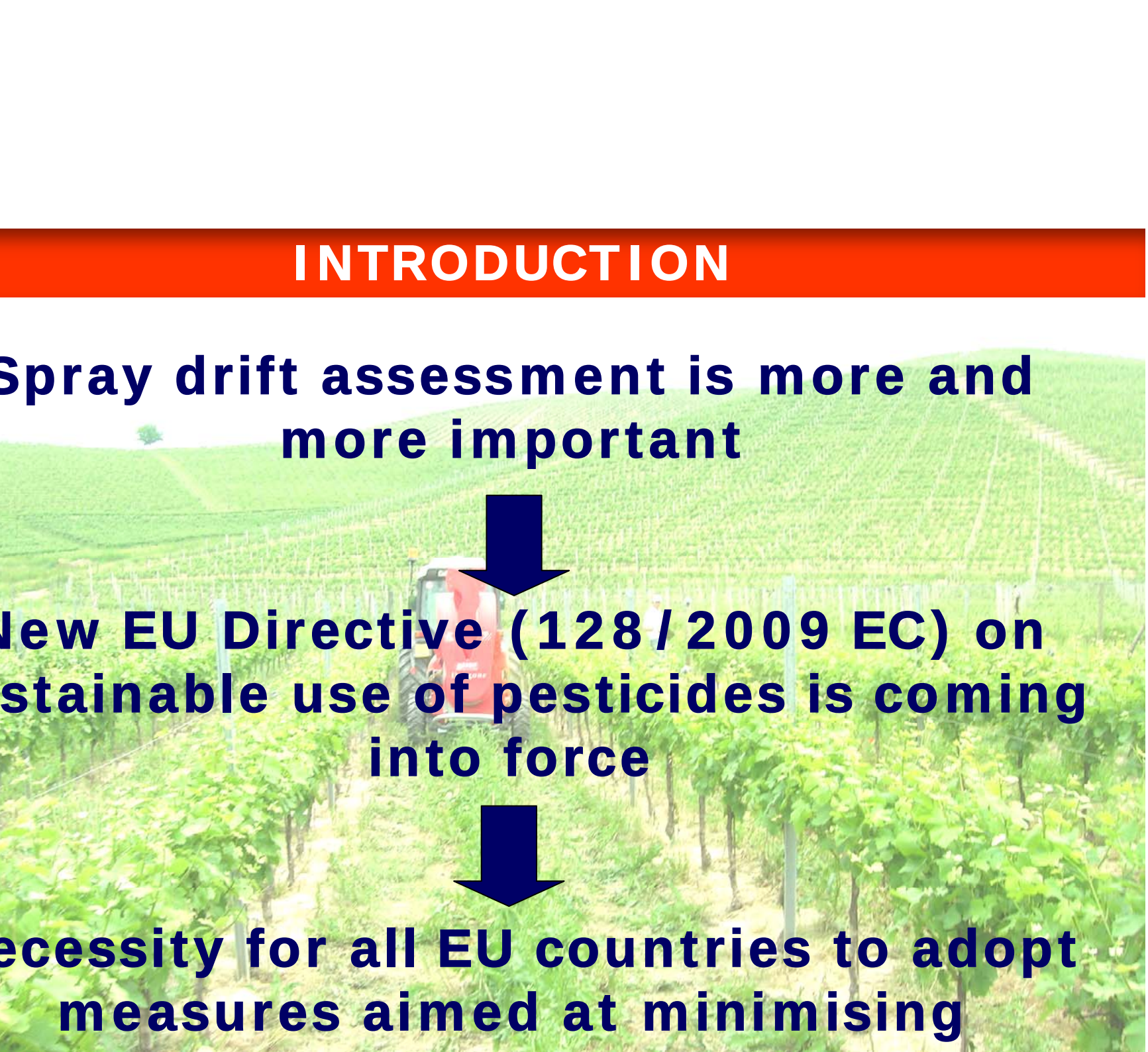
INTRODUCTION

at is drift?

inition according to ISO 22866 standard:

ray drift is the quantity of plant protection
duct that is carried out of the sprayed
ated) area by the action of air currents

INTRODUCTION



Spray drift assessment is more and more important

New EU Directive (128/2009 EC) on sustainable use of pesticides is coming into force

necessity for all EU countries to adopt measures aimed at minimising

INTRODUCTION

IVIRONMENTAL RISKS CONCERNING SPRAY DRIFT

ONTAMINATION OF WATER COURSES

ONTAMINATION OF SENSITIVE AREAS (e.g. atural parks, wetlands, etc.)

ONTAMINATION OF ADJACENT CROPS

ONTAMINATION OF URBAN AREAS

INTRODUCTION

MAIN REQUIREMENTS RELATED TO SPRAY DRIFT CLUDED IN EU DIRECTIVE 128/2009 ON SUSTAINABLE USE OF PESTICIDES

Article 11

Specific measures to protect the aquatic environment and drinking water

Giving preference to the most efficient application techniques such as the use of low-drift pesticide application equipment especially in vertical crops such as hops and those found in orchards and vineyards.

INTRODUCTION

MAIN REQUIREMENTS RELATED TO SPRAY DRIFT LUDED IN EU DIRECTIVE 128/2009 ON SUSTAINABLE USE OF PESTICIDES

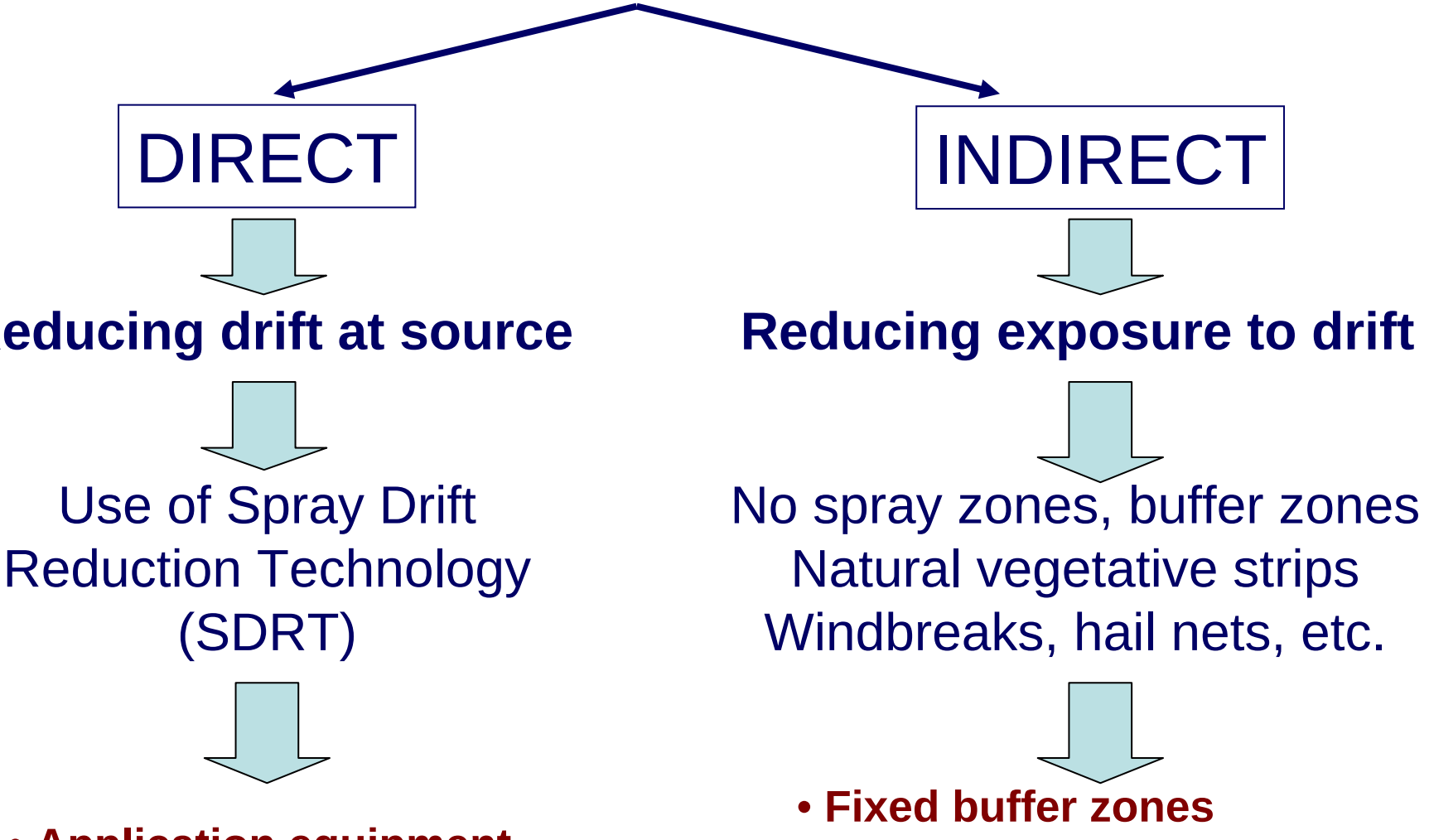
Article 11

Specific measures to protect the aquatic environment and drinking water

Use of mitigation measures which minimise the risk of off-site pollution caused by spray drift, drain-flow and run-off. These shall include the establishment of **appropriately-sized buffer zones** for the protection of non-target aquatic organisms and **safeguard zones** for surface and groundwater used for the abstraction of drinking water, where pesticides must not be

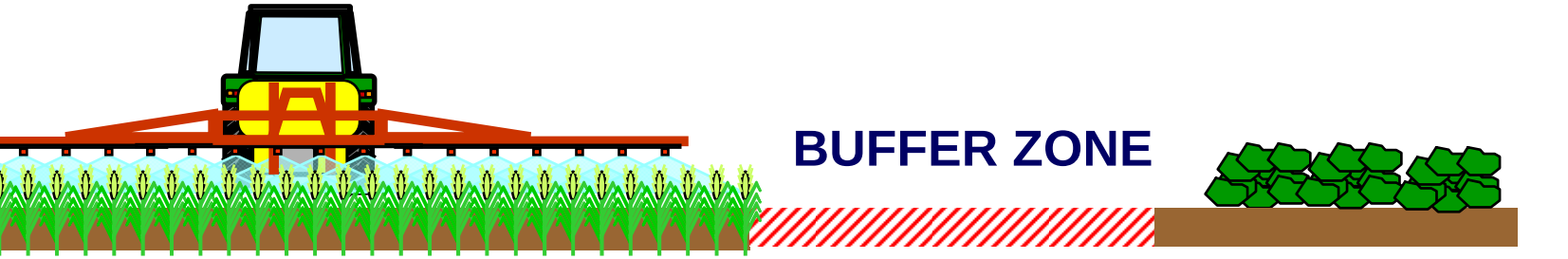
INTRODUCTION

EASURES TO PROTECT ENVIRONMENT FROM DRIFT



INTRODUCTION

In several EU countries legislative measures are already in force establishing buffer zone widths to be respected for reducing spray drift contamination risks



BUFFER ZONE

NOT SPRAYED

n metres

Sprayed crop

Sensitive area (or water course)

PLE

LERAP (UK)

iteria for determination of buffer zones width (m), for field crop sprayers

ter course width	PPP full dose				PPP half dose			
	Nozzle type				Nozzle type			
	s	★	★★	★★★	s	★	★★	★★★
: 3 m	5	4	2	1	2	1	1	1
÷ 6 m	3	2	1	1	1	1	1	1
- 6 m	2	1	1	1	1	1	1	1

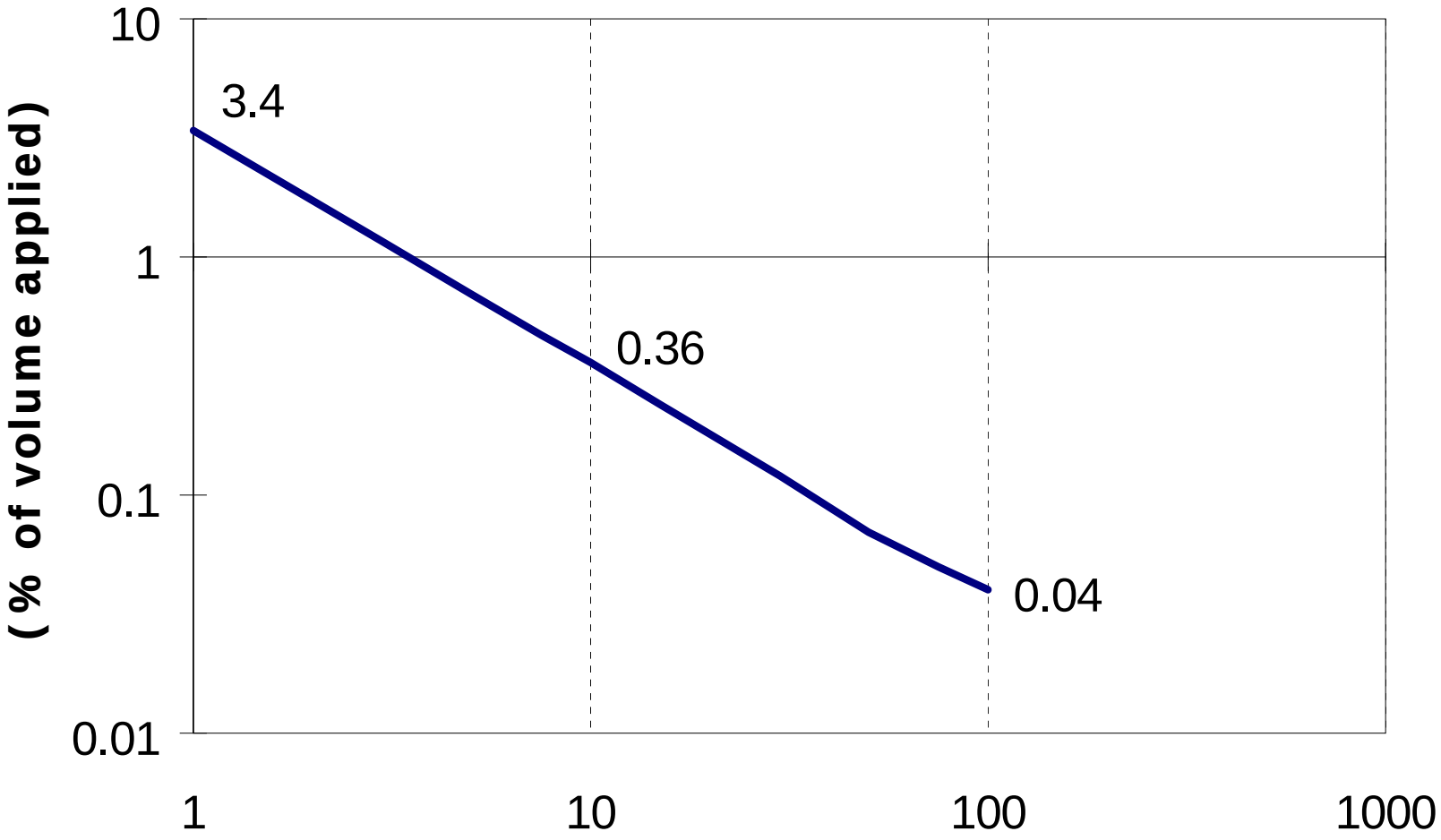
- **Standard**

THE PROBLEM

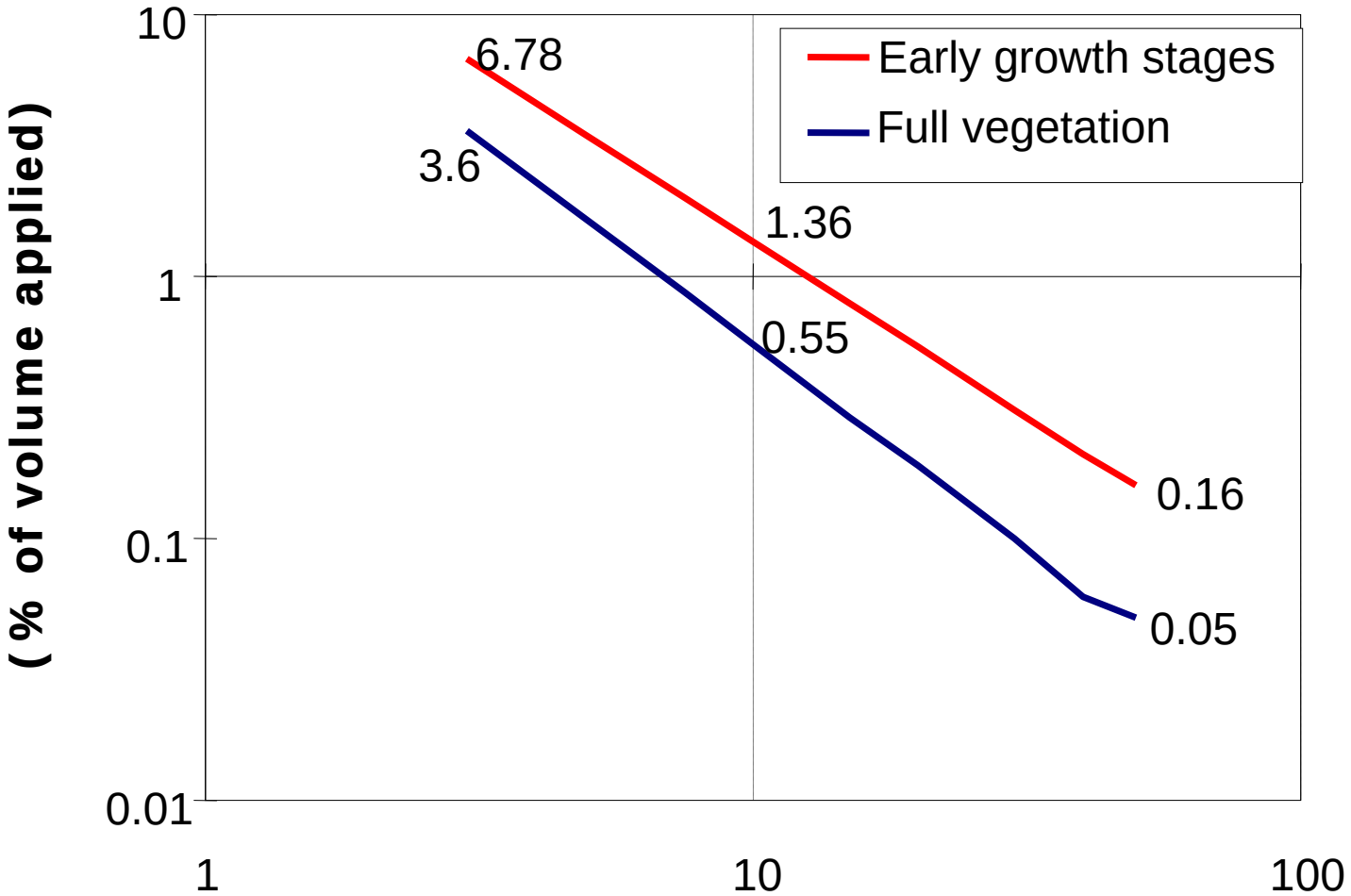
Up to now, most of the models adopted in Europe to define **buffer zone widths are based on Ganzelmeier drift curves** trapolated on the basis of hundreds of **drift sts carried out in Germany** by BBA (now KI) in some typical contexts (arable crops, eyards, orchards, hops) **according to ISO 22866 methodology**.

Are these reference drift curves

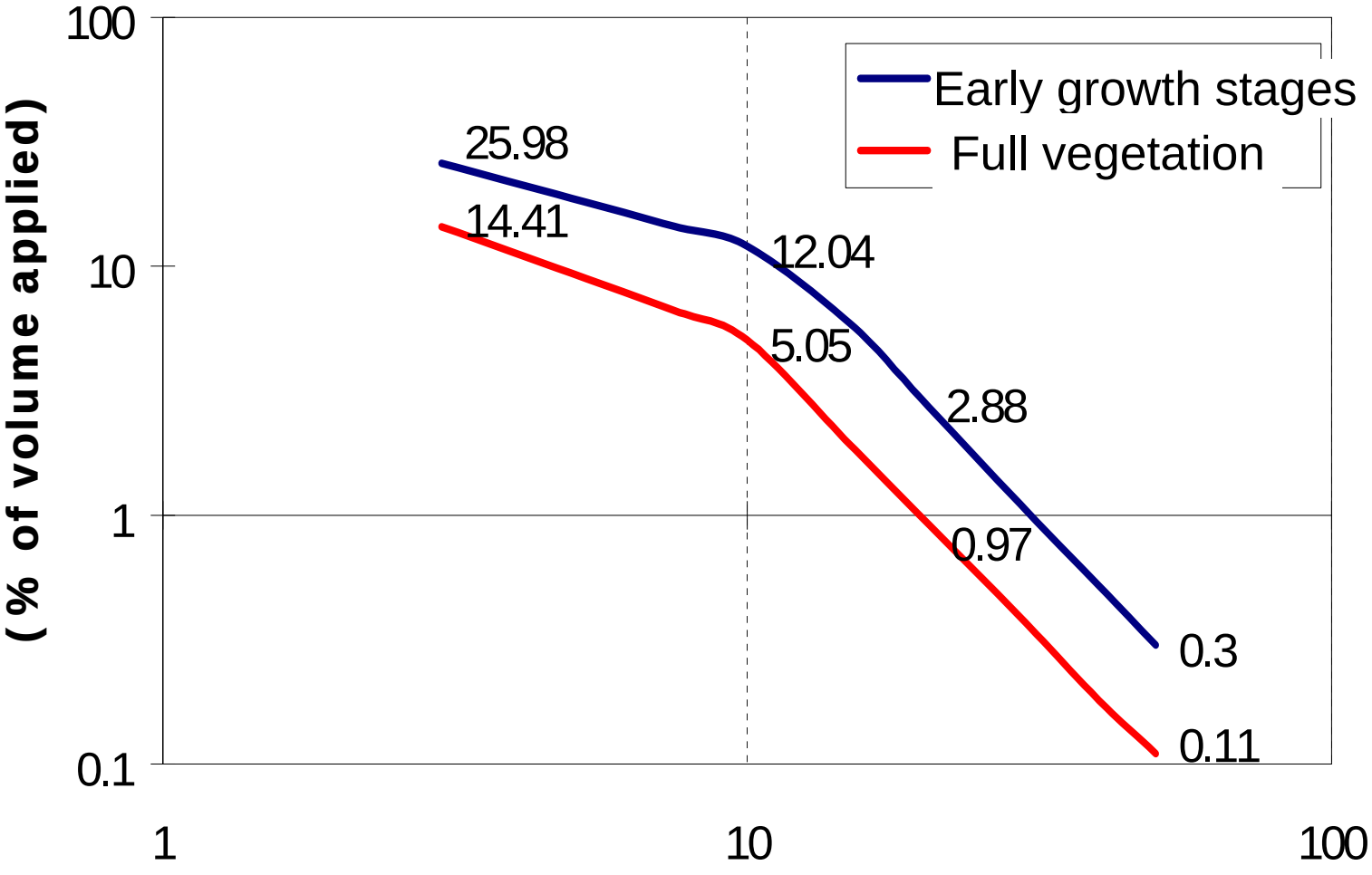
Ganzelmeier drift curves (ground sediment)
Arable crops



Ganzelmeier drift curves (ground sediment) Vineyard

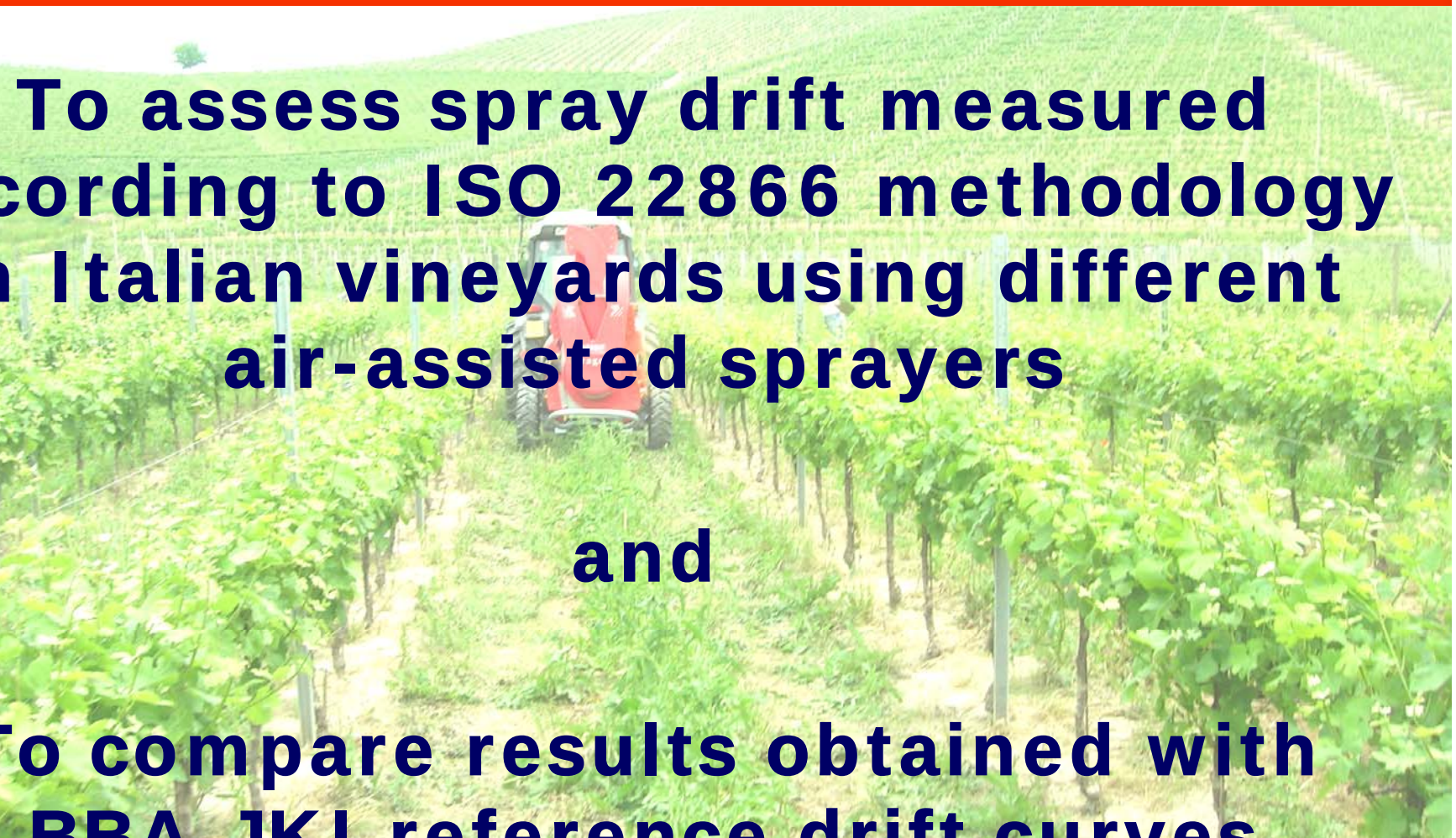


Ganzelmeier drift curves (ground sediment) Orchard



OBJECTIVE OF THE STUDY

(funded by AGROFARMA)



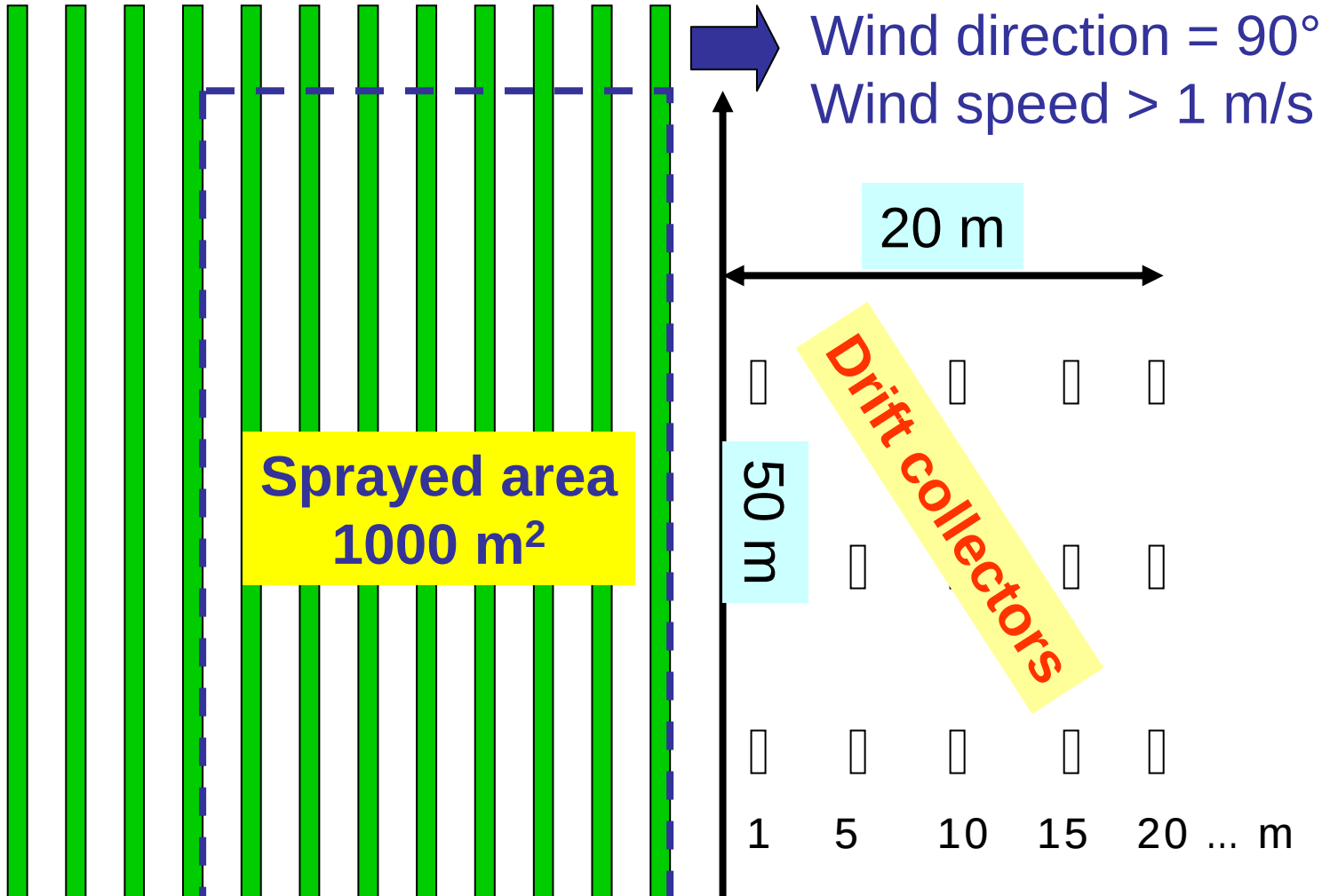
To assess spray drift measured cording to ISO 22866 methodology n Italian vineyards using different air-assisted sprayers

and

To compare results obtained with BBA-JKI reference drift curves

MATERIALS AND METHODS

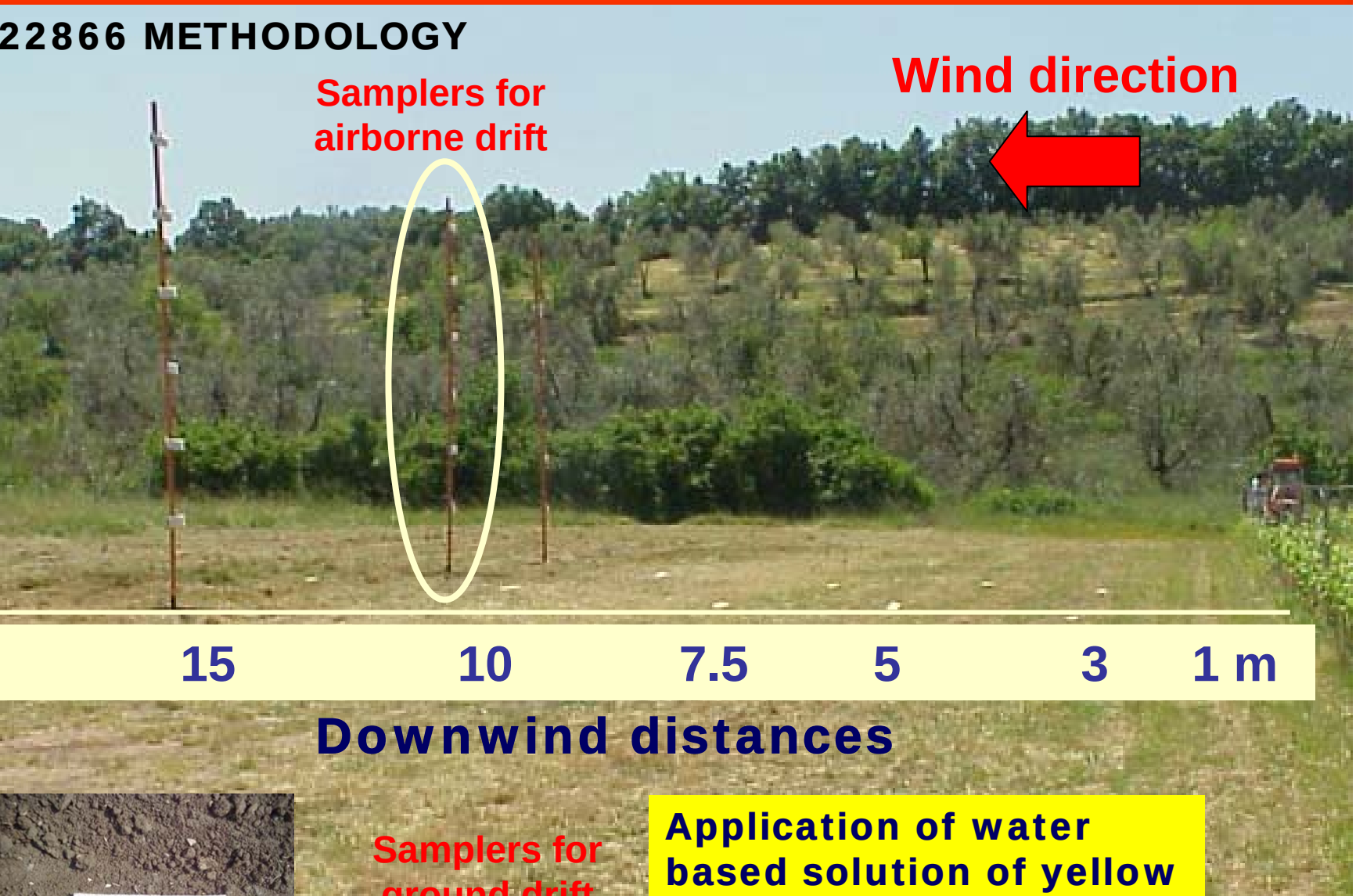
ISO 22866 METHODOLOGY



Wind direction = 90° ± 30°
Wind speed > 1 m/s

MATERIALS AND METHODS

22866 METHODOLOGY



MATERIALS AND METHODS

sts were made in Tuscany region:
Azienda Scienza

MATERIALS AND METHODS

TWO VINEYARD TYPES

Syrah trained at Guyot,
yout 1.8 x 0.7 m (7800
ants/ha), LAI max. 1.6

Cabernet Sauvignon
ained at Guyot, layout 1.8
0.8 m (6850 plants/ha)

MATERIALS AND METHODS

TWO GROWTH STAGES

rah vineyard

End of flowering
BCH 69)

LAI = 0.5

Majority of berries
ıching (BBCH 79)

LAI = 1.6

MATERIALS AND METHODS

TWO GROWTH STAGES

abernet Sauvignon
neyard

End of lowering
BCH 69)

LAI = 0.3

Majority of berries
uching (BBCH 79)

MATERIALS AND METHODS

3 TYPES OF SPRAYERS TESTED

ONVENTIONAL AIR-
SSISTED (AXIAL FAN)

ROSS FLOW AIR-
ISTED

NEUMATIC

MATERIALS AND METHODS

SPRAYERS TESTED

CONVENTIONAL AIR-ASSISTED SPRAYER
Dragone Athos 200

flow rates (8000
1000 m³/h)

zzle types
nventional hollow cone,
pressure, VMD 180 µm

induction flat fan, 5 bar
ure, VMD 420 µm

e volume

MATERIALS AND METHODS

SPRAYERS TESTED

CROSS FLOW AIR-ASSISTED SPRAYER
Dragone $K_2$500

**flow rates (14000
20000 m³/h)**

zzle types
**nventional hollow cone,
pressure, VMD 180 µm**

**induction flat fan, 5 bar
ure, VMD 420 µm**

e volume

MATERIALS AND METHODS

SPRAYERS TESTED

PNEUMATIC SPRAYER
Cima Blitz 45T

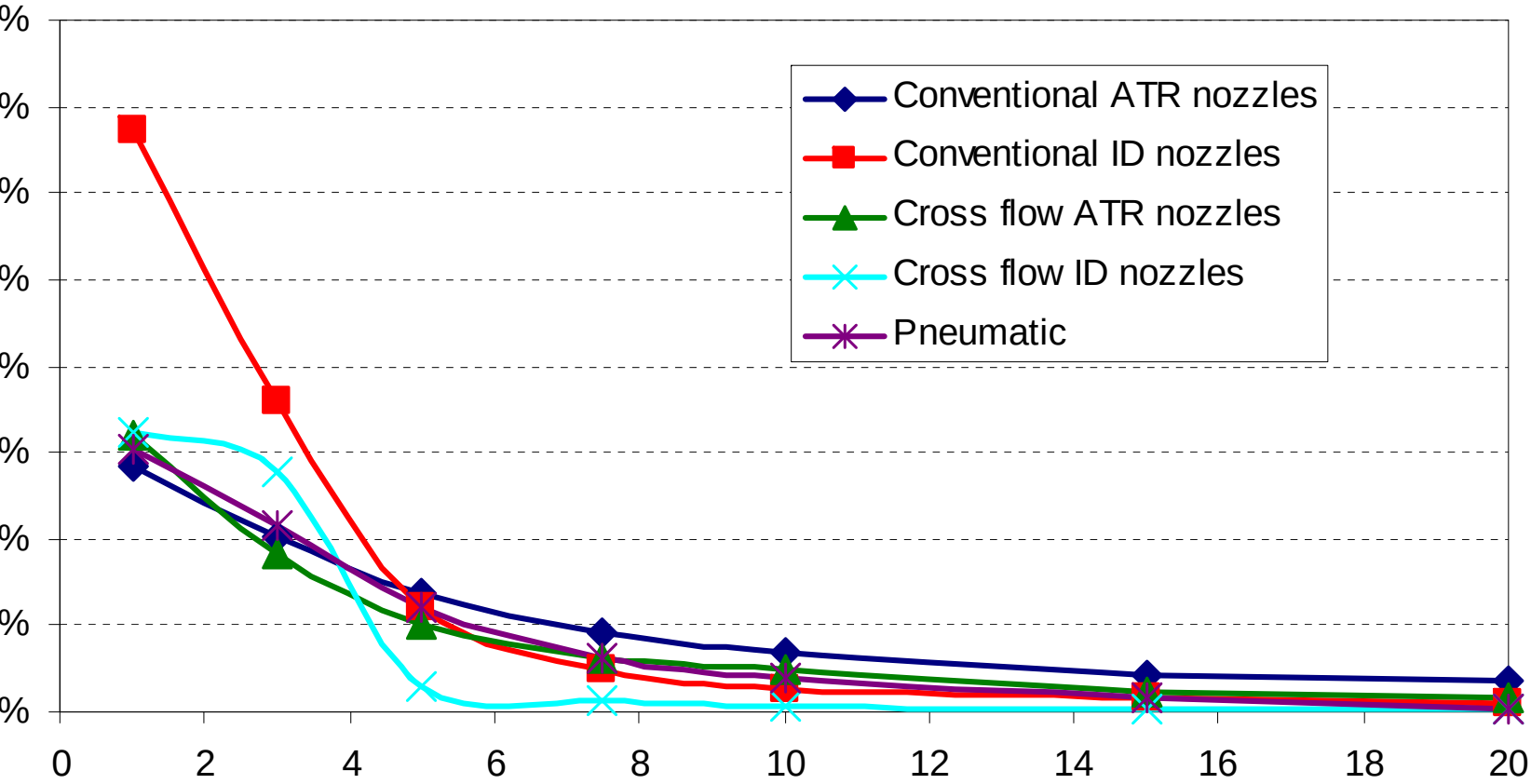
single sprayer
figuration tested
diffusors with four
uts each)

D 100 µm

ed air flow rate (6500
h)

RESULTS

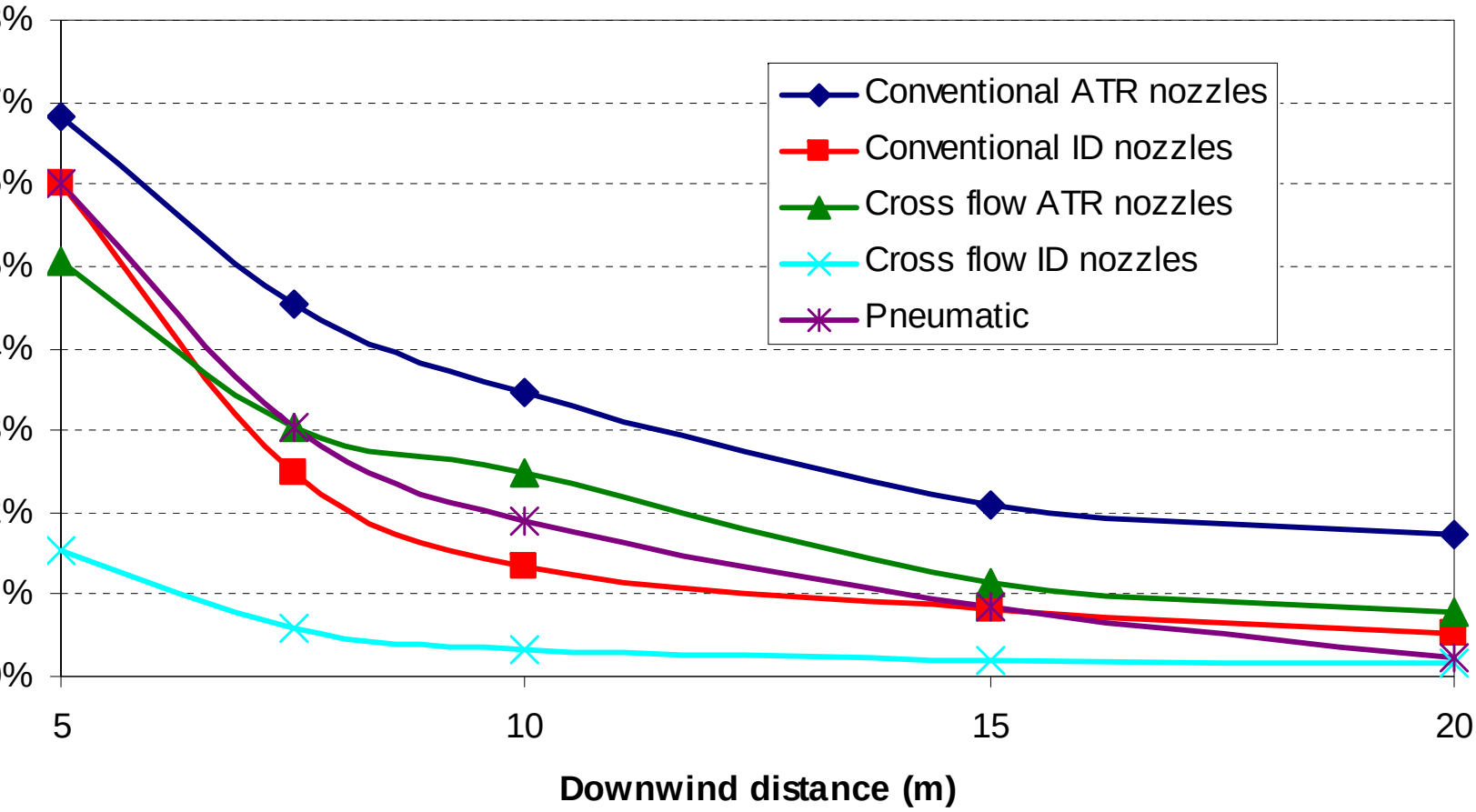
Syrah vineyard, end of flowering (BBCH 69)



RESULTS

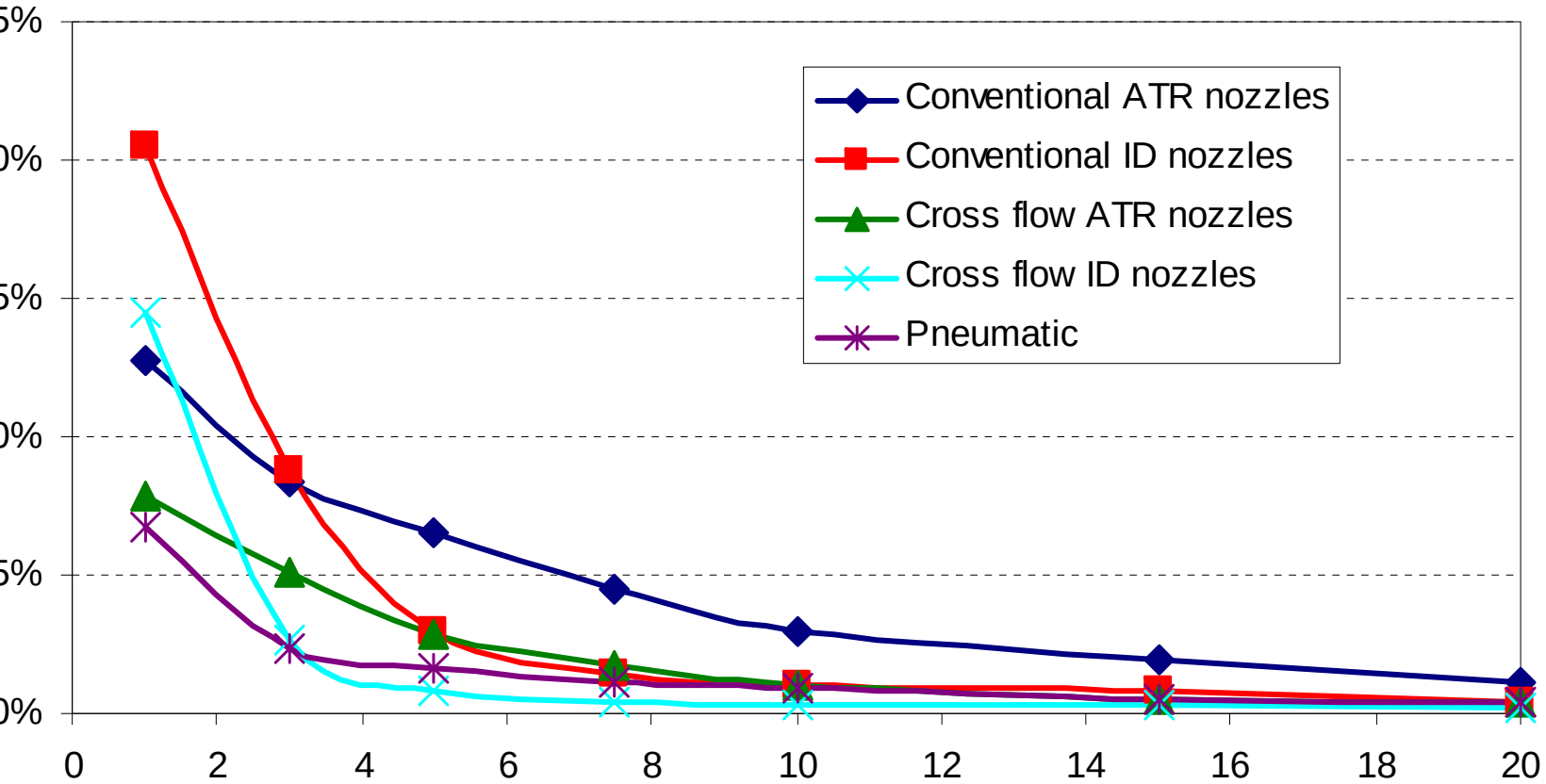
Syrah vineyard, end of flowering (BBCH 69)

Detail over 5 m downwind distance



RESULTS

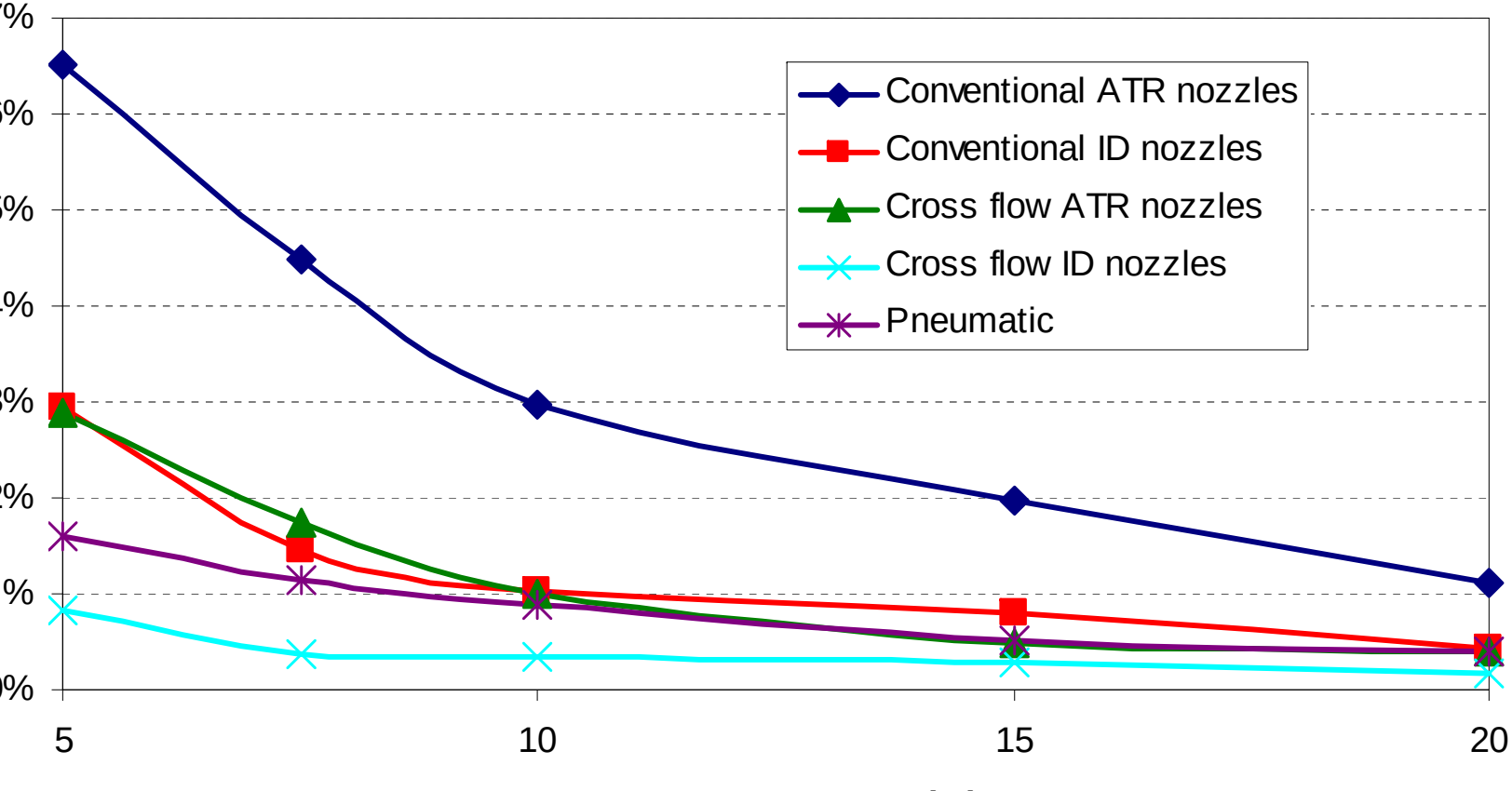
Syrah vineyard, majority of berries touching (BBCH 79)



RESULTS

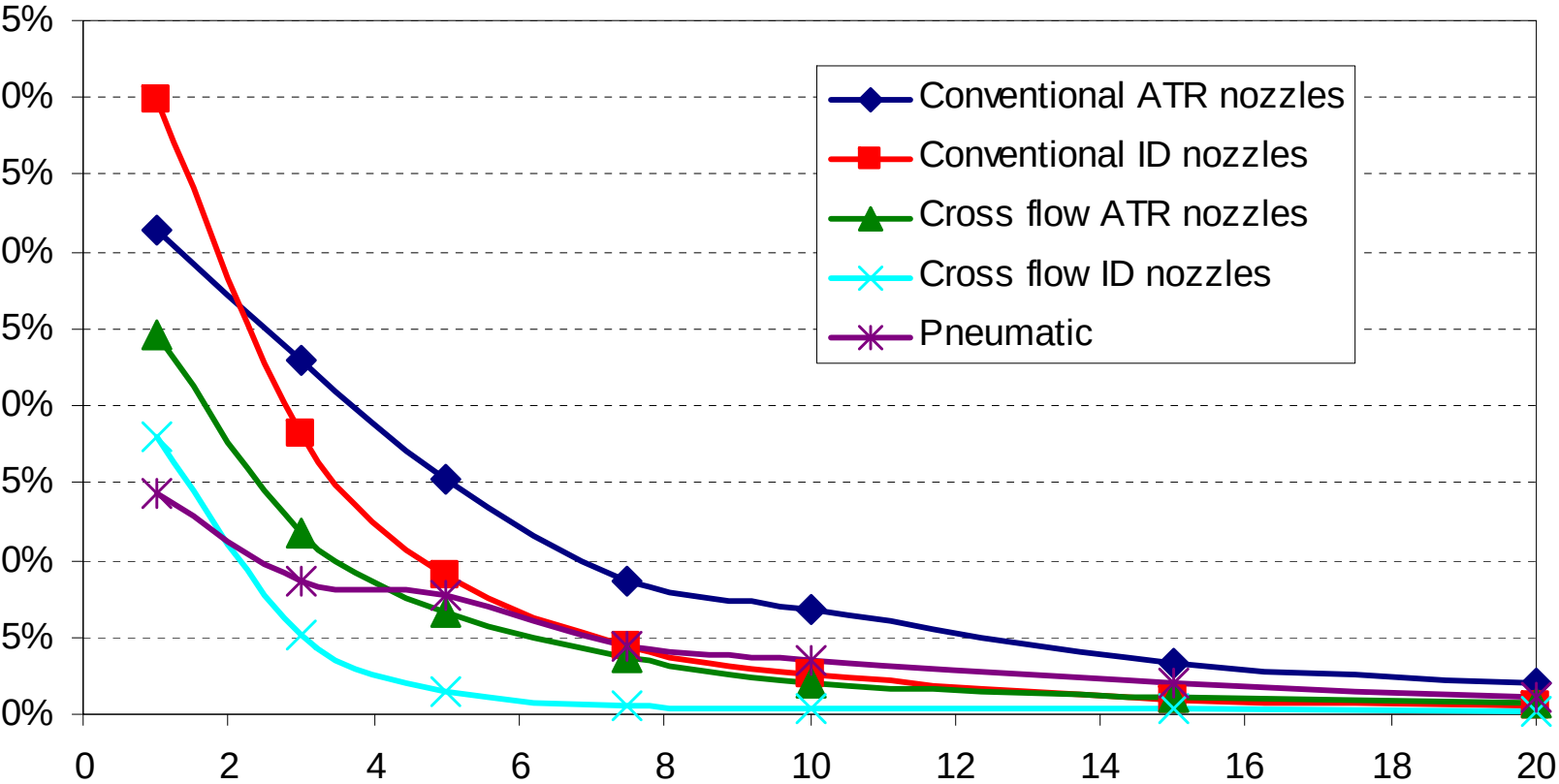
Syrah vineyard, majority of berries touching (BBCH 79)

Detail over 5 m downwind distance



RESULTS

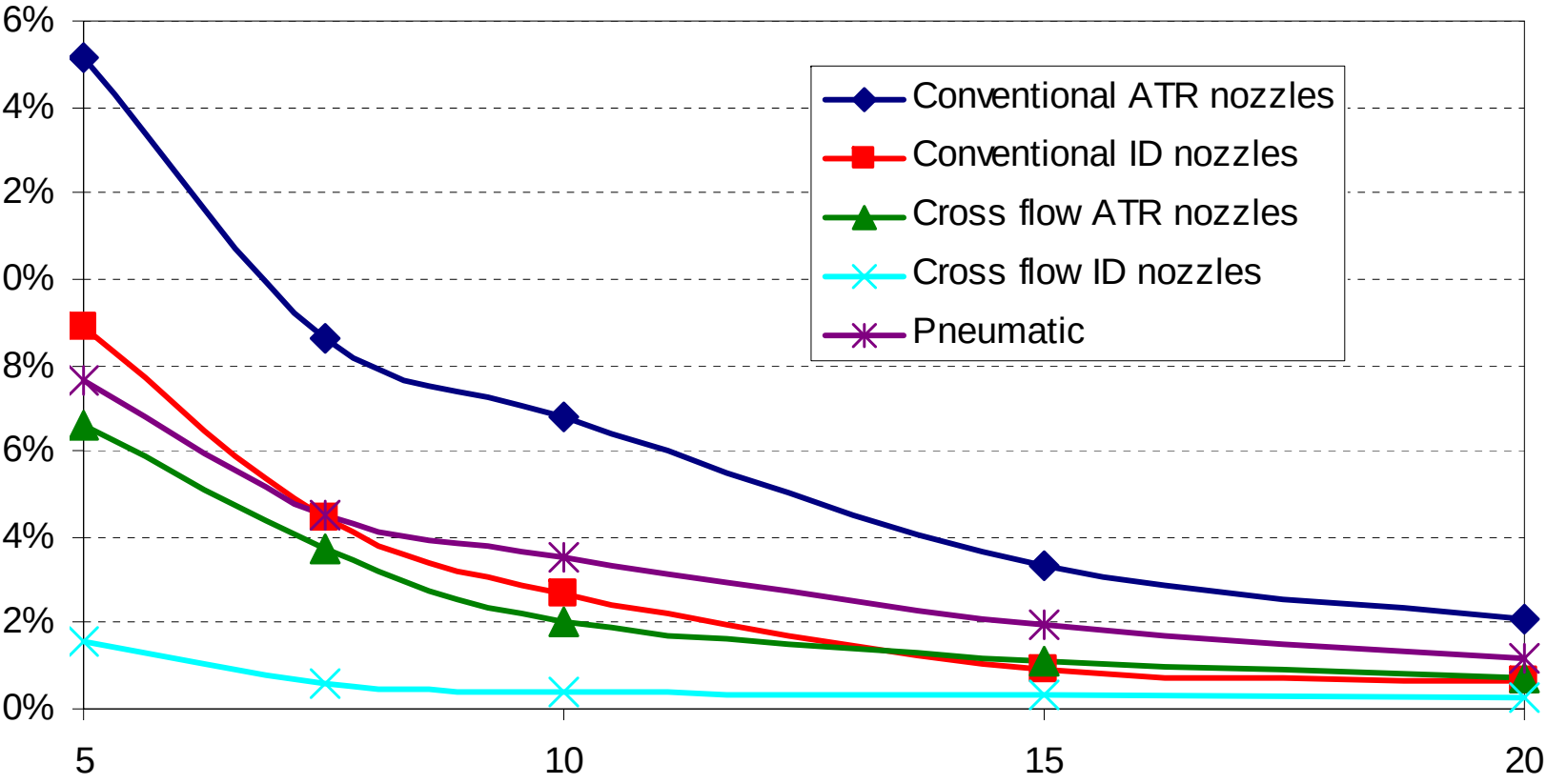
Cabernet Sauvignon vineyard, end of flowering (BBCH 69)



RESULTS

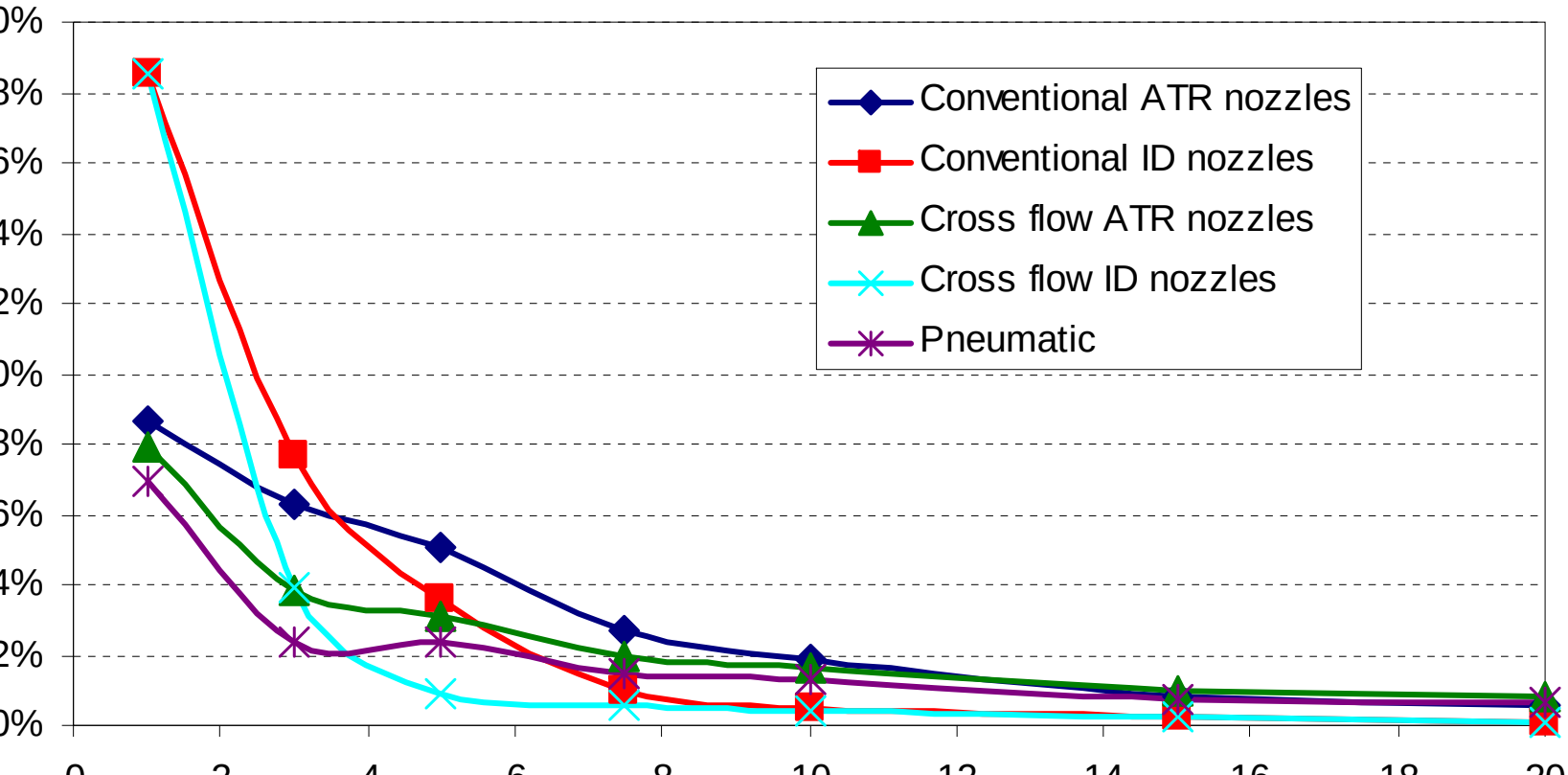
Cabernet Sauvignon vineyard, end of flowering (BBCH 69)

Detail over 5 m downwind distance



RESULTS

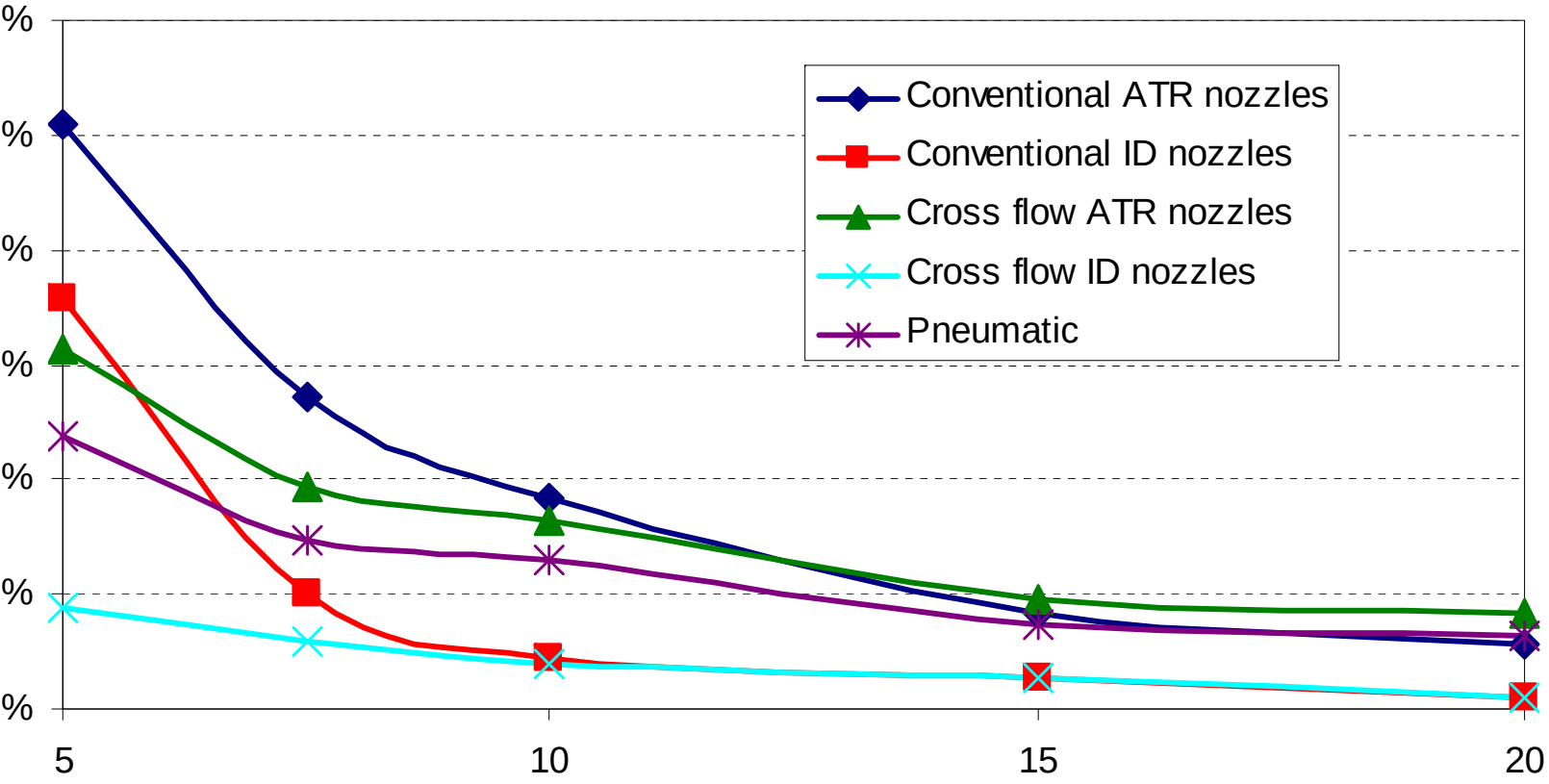
Cabernet Sauvignon vineyard, majority of berries touching (BBCH 79)



RESULTS

Cabernet Sauvignon vineyard, majority of berries touching (BBCH 79)

Detail over 5 m downwind distance

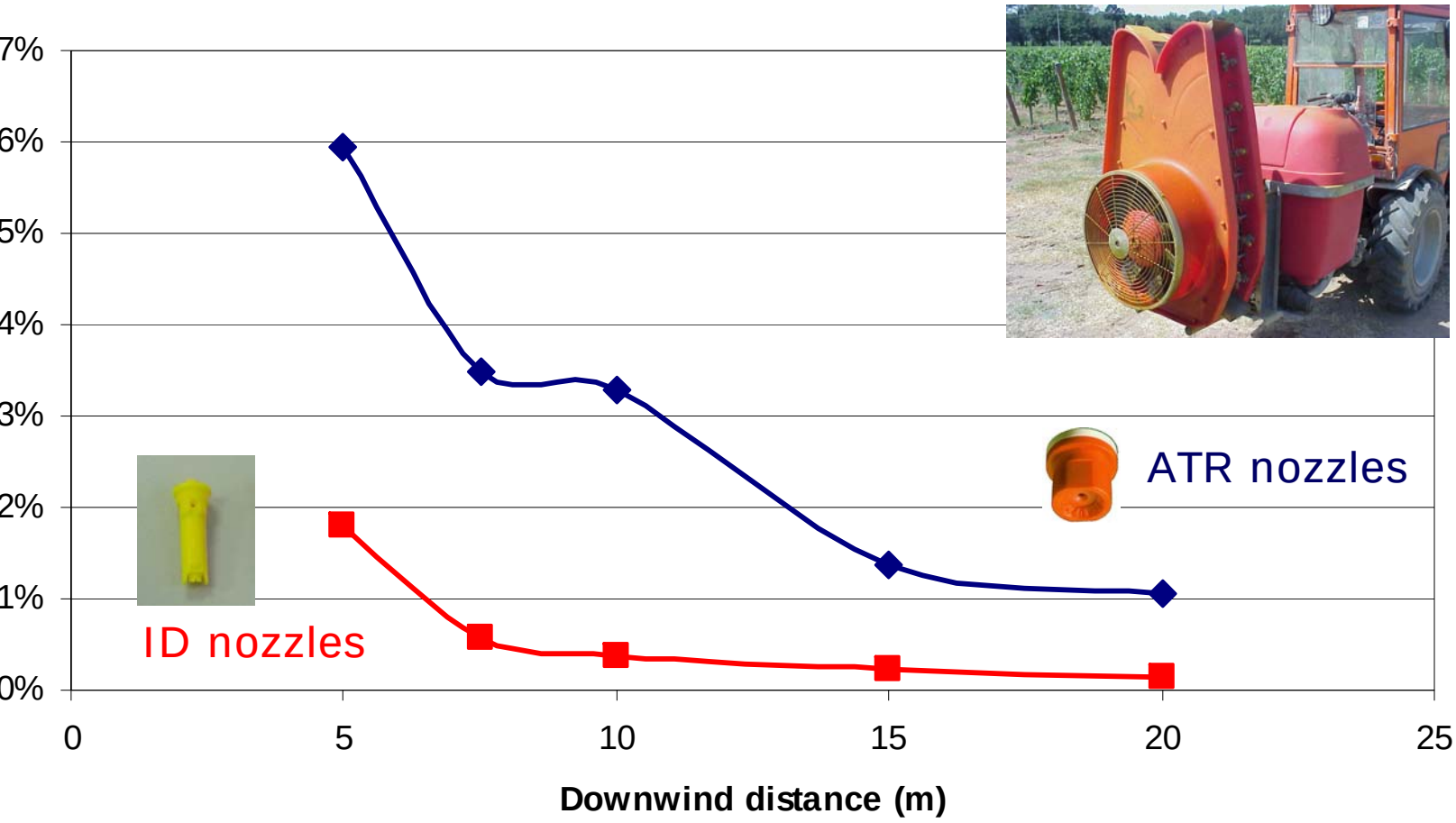


EIGHT" OF THE DIFFERENT VARIABLES EXAMINED ON THE AMOUNT OF DRIFT REGISTERED OVER 5 m FROM THE SPRAYED AREA

SE OF AIR INDUCTION NOZZLES	★★★
NEYARD TYPE AND GROWTH STAGE	★★★
PRAYER TYPE	★★
IR FLOW RATE	★

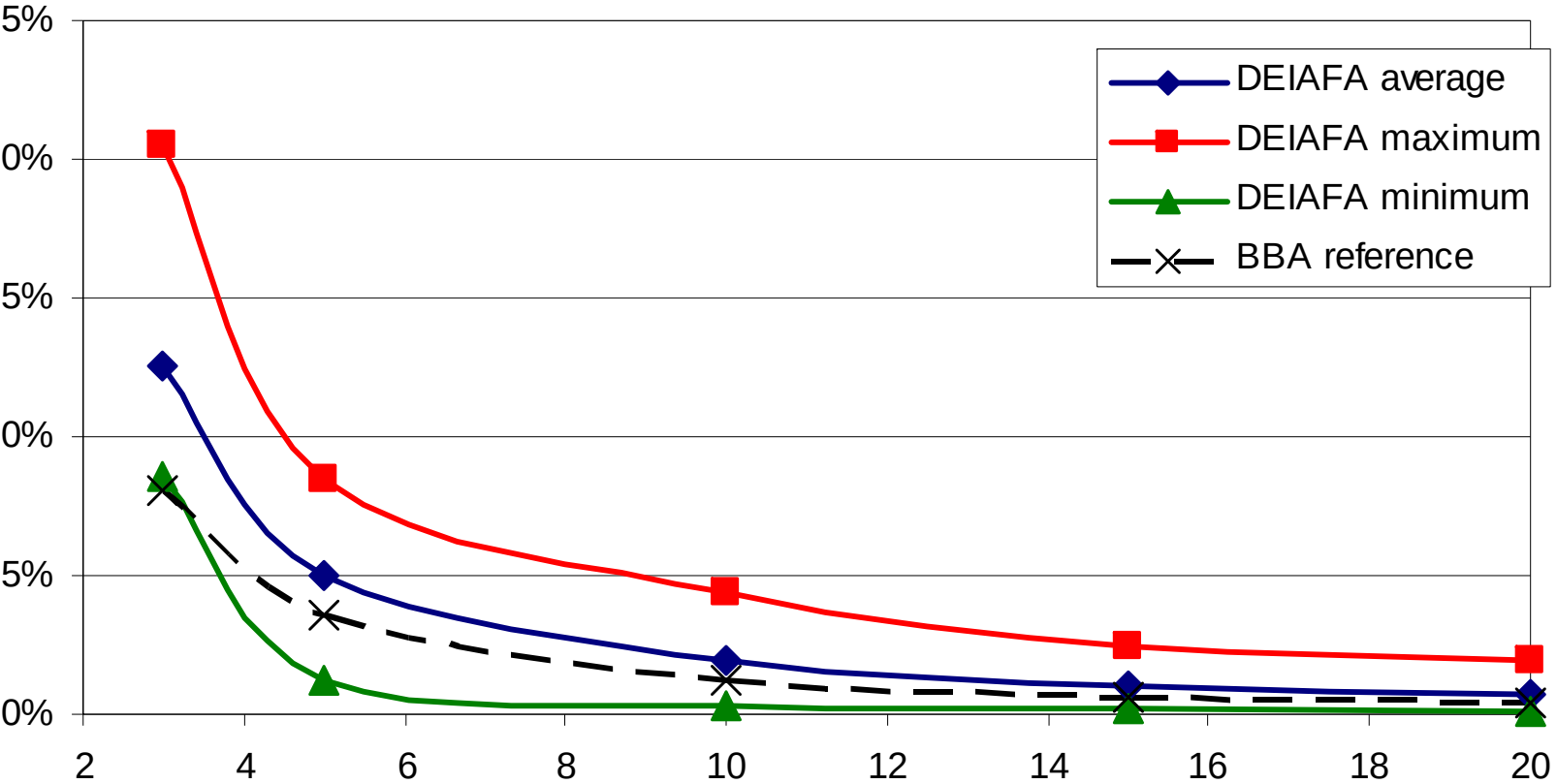
Thanks to the use of Spray Drift Reducing

Example of results of tests made in Syrah vineyard at end of flowering (BBCH 69) using the cross flow sprayer



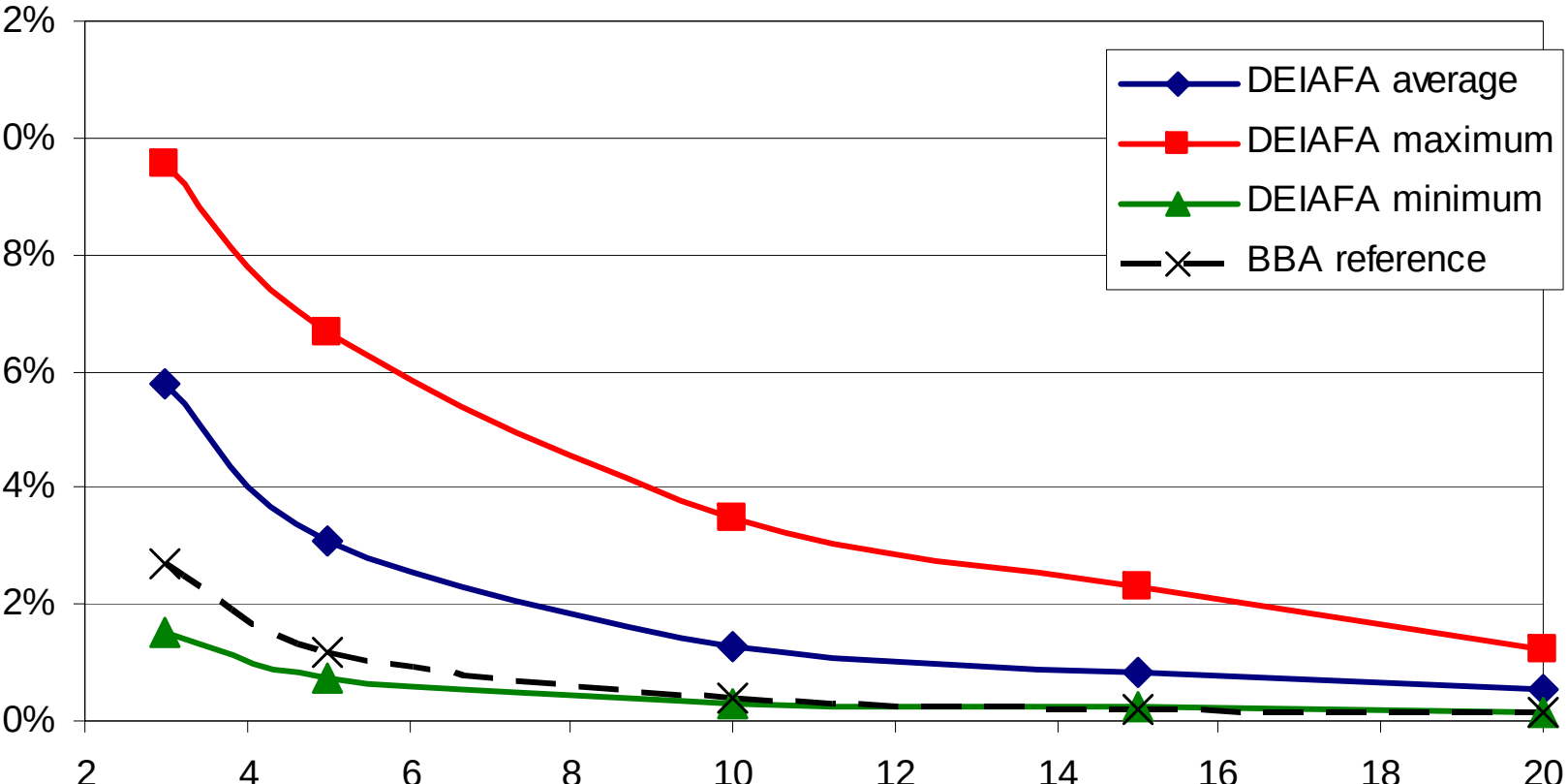
OMPARISON WITH BBA DRIFT CURVES

Syrah vineyard, end of flowering (BBCH 69)



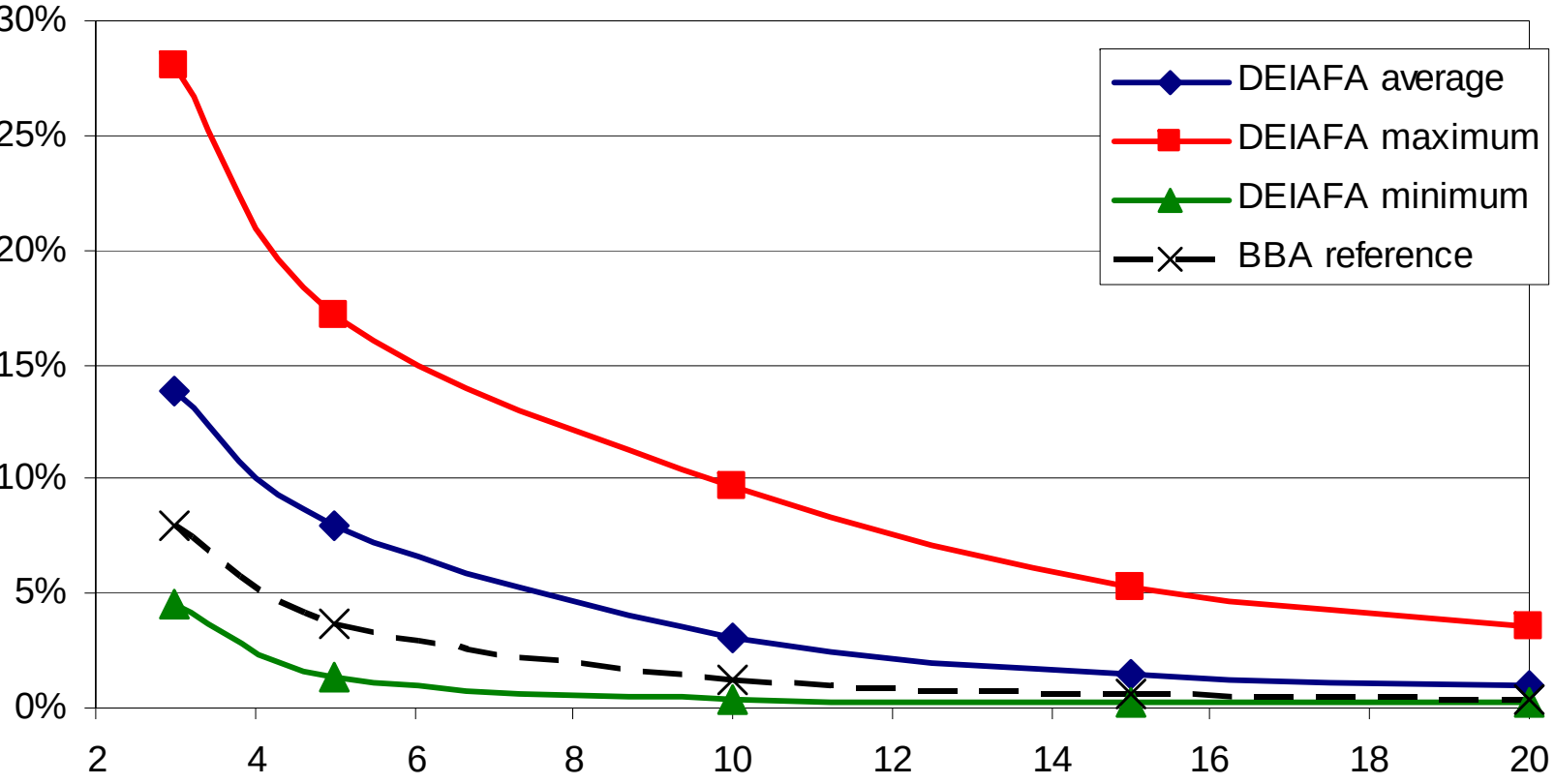
OMPARISON WITH BBA DRIFT CURVES

Syrah vineyard, majority of berries touching (BBCH 79)



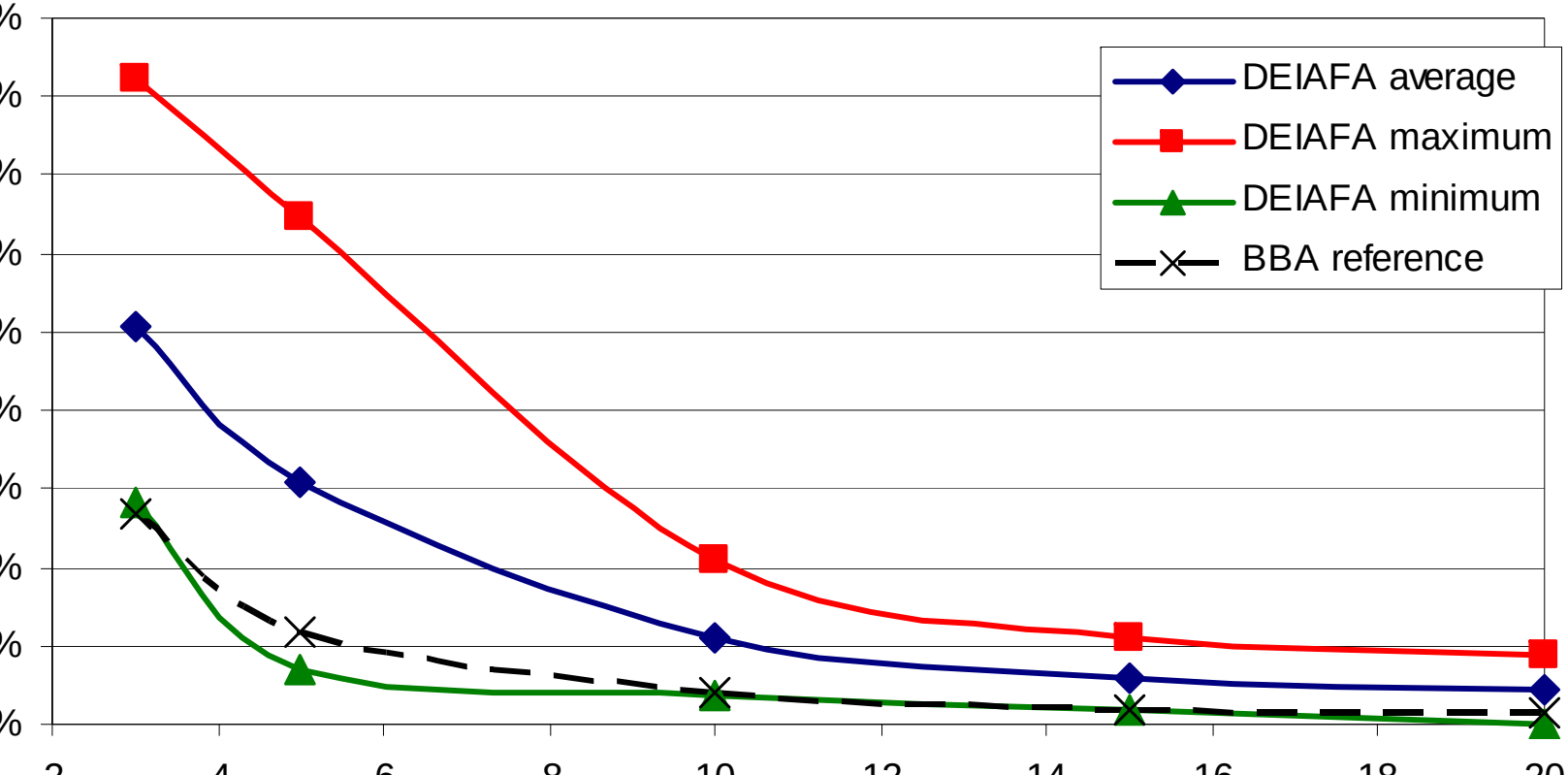
OMPARISON WITH BBA DRIFT CURVES

Cabernet Sauvignon vineyard, end of flowering (BBCH 69)



OMPARISON WITH BBA DRIFT CURVES

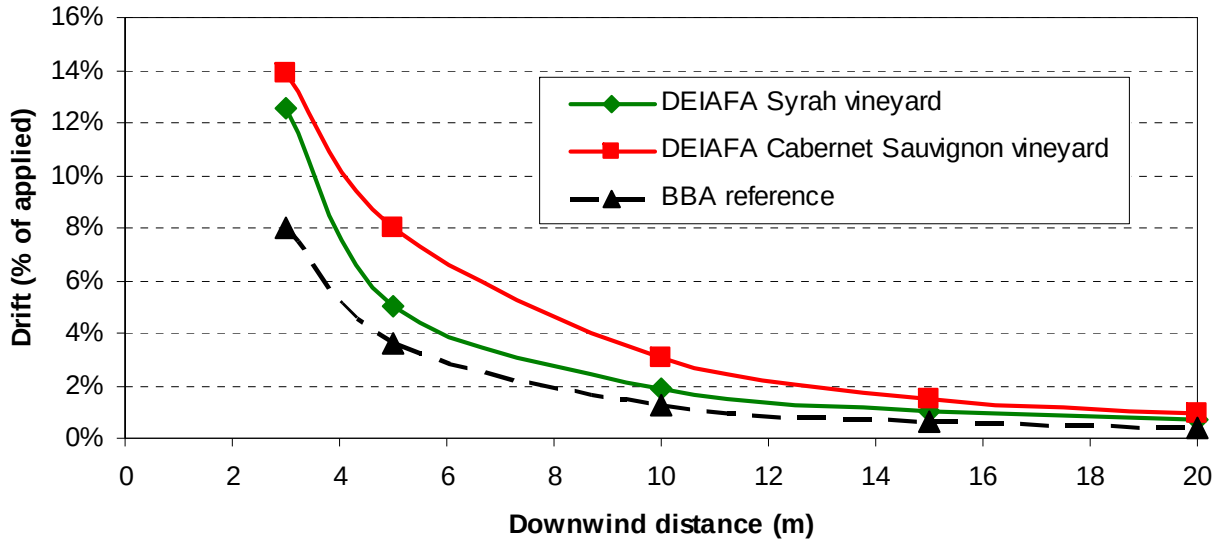
Cabernet Sauvignon vineyard, majority of berries touching (BBCH 79)



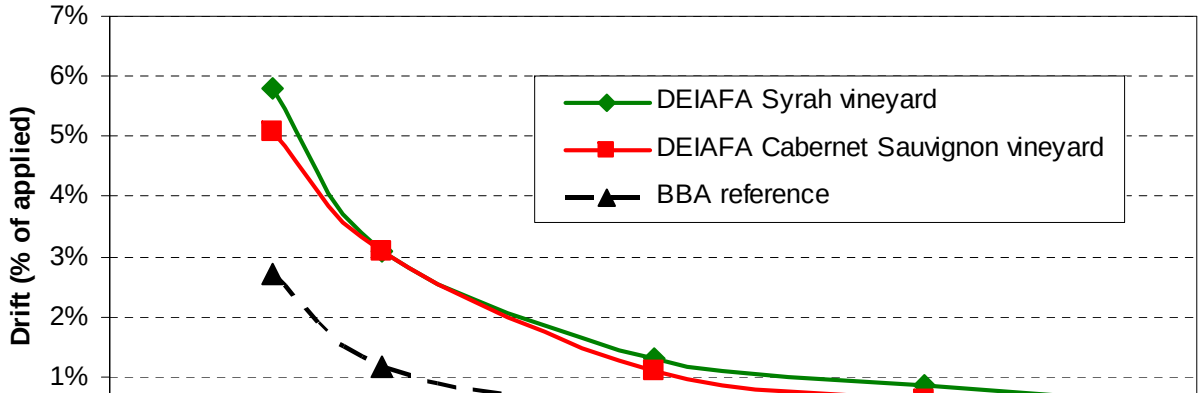
OMPARISON WITH BBA DRIFT CURVES

hese first
onal results
ndicated
age curves
erally over
he BBA
rence ones.

BBCH 69 (early growth stage)



BBCH 79 (late growth stage)



CONCLUSIONS

DEIAFA drift curves are different from BBA curves (higher drift values)

POSSIBLE REASONS

gher canopy density of the German neyards (different layout, training system, rieties, etc.)

fferent environmental conditions (wind peed and air temperature)

CONCLUSIONS

o build **reference drift curve for Italian vineyards** more experimental data are needed considering several different vine raining systems and application scenarios.

A specific research project is needed

THE ITALIAN SITUATION

ORE THAN 1000 VINE TRAINING SYSTEMS USED

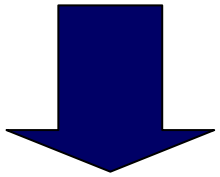
IDONE **GUYOT** **CASARSA** **ALBERELLO**

Examples of main vine training systems adopted in Italy

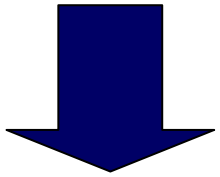
ORE THAN 100 TYPES OF SPRAYER MODELS USED

CONCLUSIONS

ational reference drift curves are necessary
lso to allow authorities to modulate buffer
zone size in function of the SDRT used



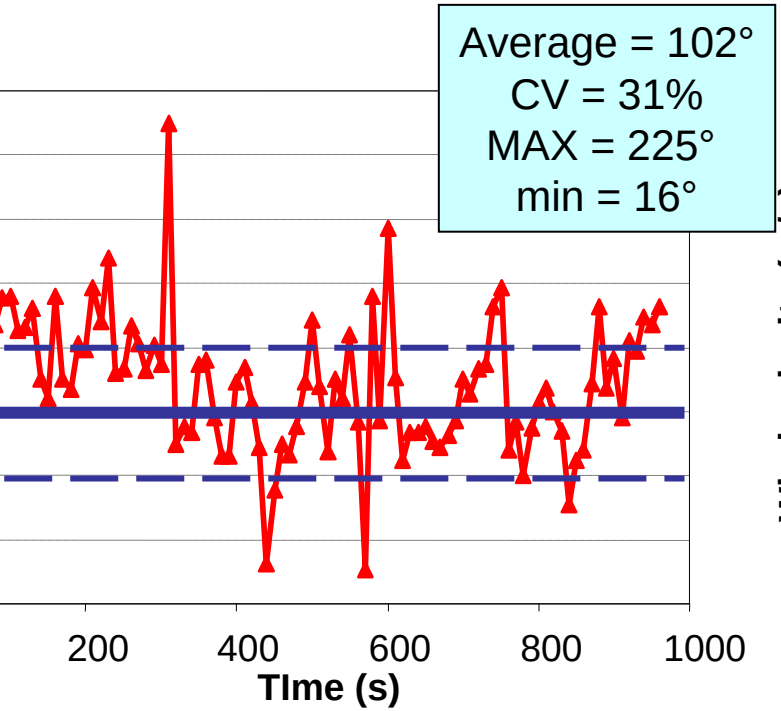
Sprayers classification in function of drift



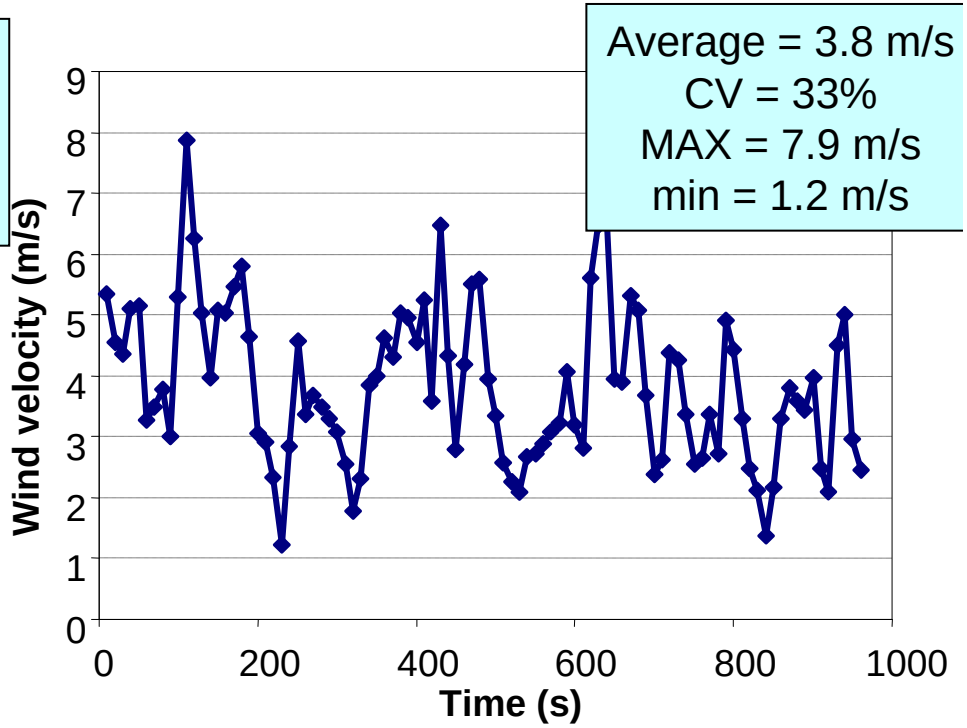
SO 22866 methodology is too complicated
for this purpose and provides limited
reproducibility of results

LIMITS OF ISO 22866 METHODOLOGY

WIND DIRECTION



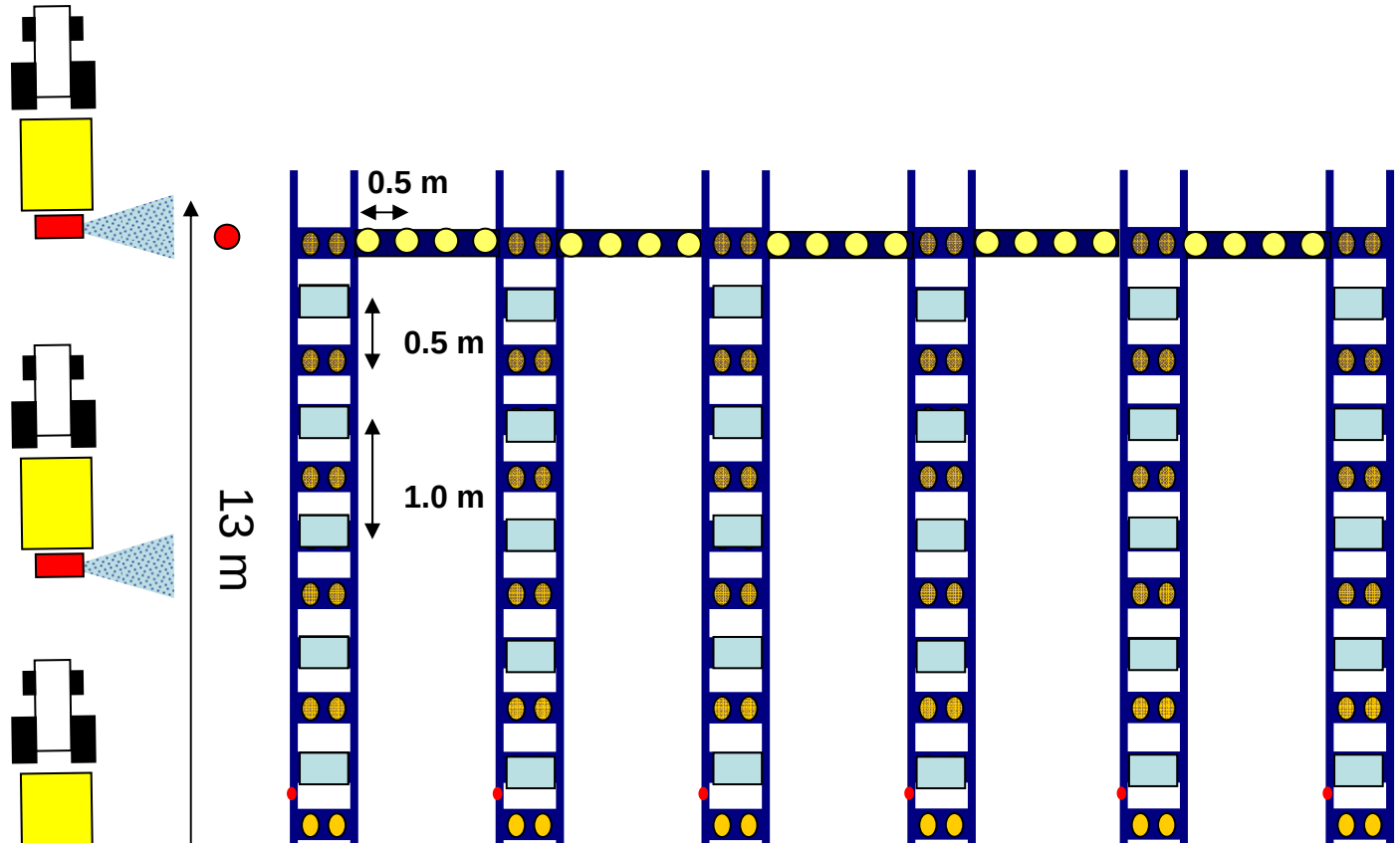
WIND VELOCITY



A complete test may require even some days of work. Costs are proportional to

CONCLUSIONS

DEIAFA is developing a system to measure and pare potential drift generated in absence of wind by ferent sprayer models using ad hoc test benches.




Many thanks for your attention
And thank you to AGROFARMA
(National Crop Protection