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JOURNÉES ANNUELLES LIEN DE LA VIGNE

VINELINK ANNUAL DAYS

PROGRAMME 2018

Prédiction, Détection et Prévention des Risques en Viticulture : Maladies, Ravageurs et Climat

Predicting, Detecting and Preventing grapevine risks: Diseases, pests and climate



PLUMPTON COLLEGE

Capture de spores de champignon et identification sur site par
amplification isotherme d'ADN (LAMP technique)

*Fungal spore trapping and on-site identification using loop-mediated
isothermal amplification (LAMP)*



Vitismart
Toward a sustainable viticulture



FACCE SURPLUS
SUSTAINABLE AND RESILIENT AGRICULTURE
FOR FOOD AND NON-FOOD SYSTEMS

Chris Foss

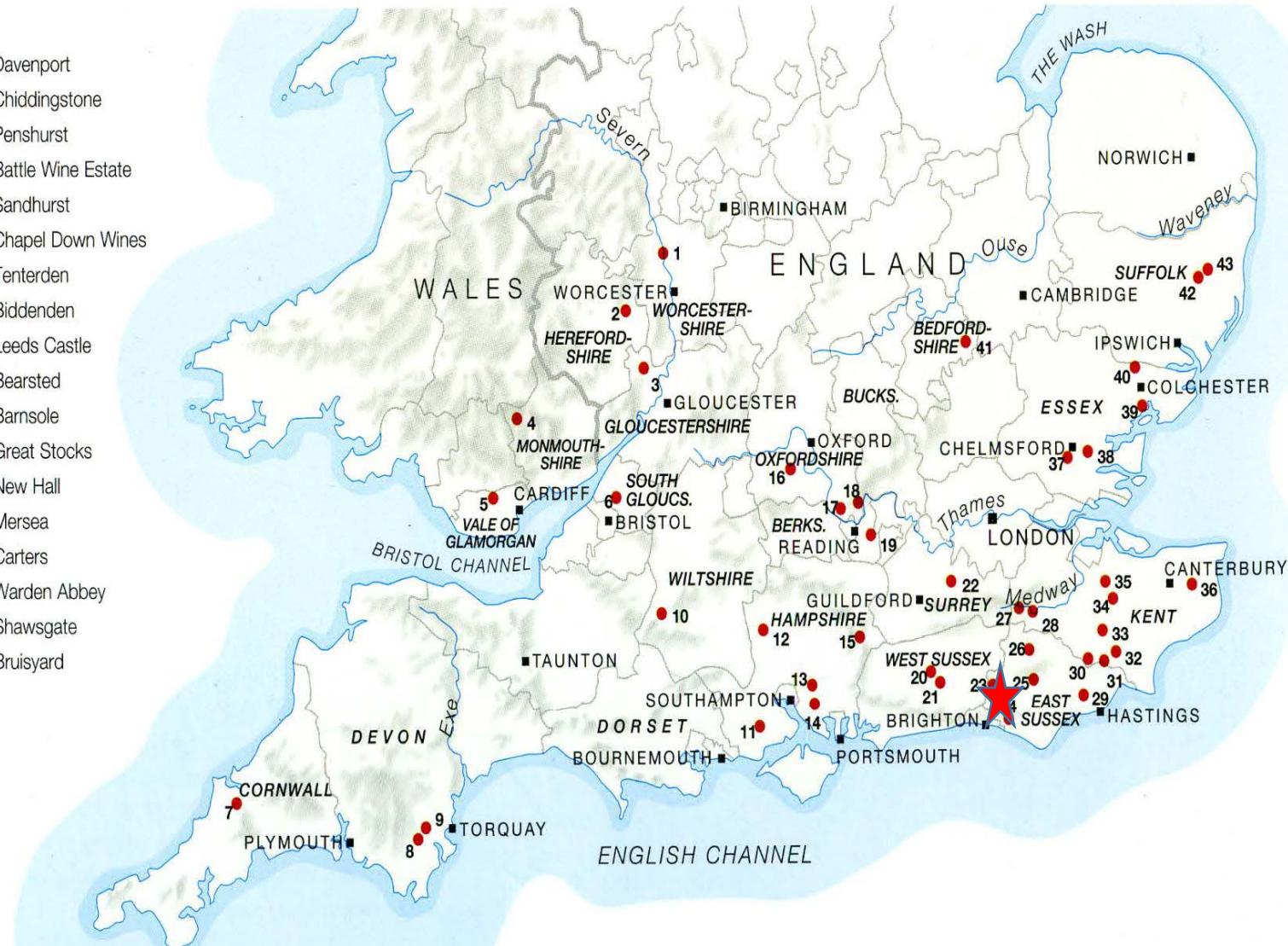
14th February 2018



The English wine industry and Plumpton College

SELECTED VINEYARDS

- 1. Astley
- 2. Frome Valley
- 3. Three Choirs
- 4. Sugar Loaf
- 5. Llanerch
- 6. St Augustine's
- 7. Camel Valley
- 8. Beenleigh Manor
- 9. Sharpham
- 10. Wylye Valley
- 11. Beaulieu Abbey
- 12. Danebury
- 13. Northbrook Springs
- 14. Wickham
- 15. Priors Dean
- 16. Bothy
- 17. Boze Down
- 18. Chiltern Valley
- 19. Valley Vineyards
- 20. Nutbourne
- 21. Nyetimber
- 22. Denbies
- 23. Ridgeview
- 24. Breaky Bottom
- 25. Hidden Spring
- 26. Davenport
- 27. Chiddingstone
- 28. Penshurst
- 29. Battle Wine Estate
- 30. Sandhurst
- 31. Chapel Down Wines
- 32. Tenterden
- 33. Biddenden
- 34. Leeds Castle
- 35. Bearsted
- 36. Barnsole
- 37. Great Stocks
- 38. New Hall
- 39. Mersea
- 40. Carters
- 41. Warden Abbey
- 42. Shawsgate
- 43. Bruisyard



Plumpton College is the centre of excellence in education, training and research in wine business and production in the UK



Wine Division activities:

- Undergraduate programmes in Wine Business and Production
- Industry training courses, workshops and masterclasses
- Commercial wine production (10 ha vineyard)
- Post-graduate courses and research:
 - Climate change mitigation and adaptation strategies (ADVICLIM)
 - Spore trapping and identification



Fera's capabilities



 **500** staff
including **350** scientists

 **80** acre secure
site with field plots,
glasshouses and a
specialist wildlife unit

 **4km** of lab benching

 **90** controlled
environment facilities

 Containment
- Cat 3 lab

 Latest chemical &
molecular biological
analysis tools



 fera

STEP 1 - KNOWLEDGE

Key pests
Pest lifecycles
Natural enemies
Growing area

STEP 5 - EVALUATION & PLANNING

Review monitoring records,
listening, reading,
thinking
Monitoring
Consult & adapt

STEP 2 - PREVENTION

Site selection
Variety
Time of planting & rotations
Water & nutrition management
Farm hygiene
Pest host management

IPM model of continual improvement

STEP 4 - INTERVENTION

Mechanical controls
Biological controls
Chemical controls

STEP 3 - OBSERVATION

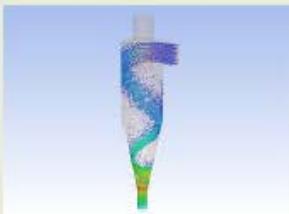
Crop monitoring
Pest prediction models
Pheromone traps
Yellow sticky traps
Monitoring

Research objective:

To investigate the potential of airborne spore traps and on-site molecular testing (LAMP) to detect powdery mildew, downy mildew and Botrytis spores for informing pesticide applications.

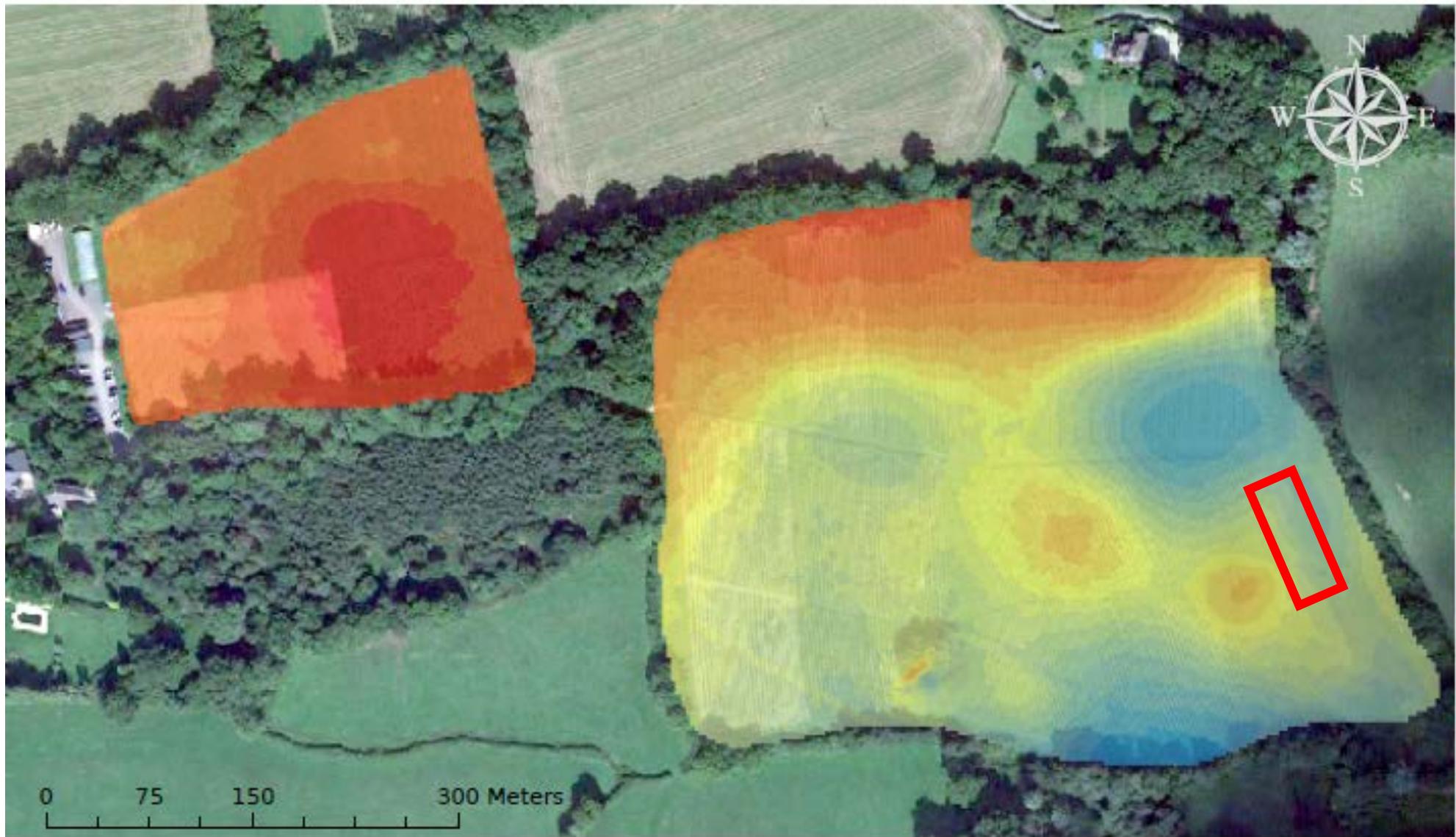
Étudier le potentiel des pièges à spores aéroportés et des tests moléculaires sur place (LAMP) pour détecter l'oïdium, le mildiou et les spores de Botrytis afin d'informer les applications de pesticides.

Spore traps





Burkard & rotarod spore traps

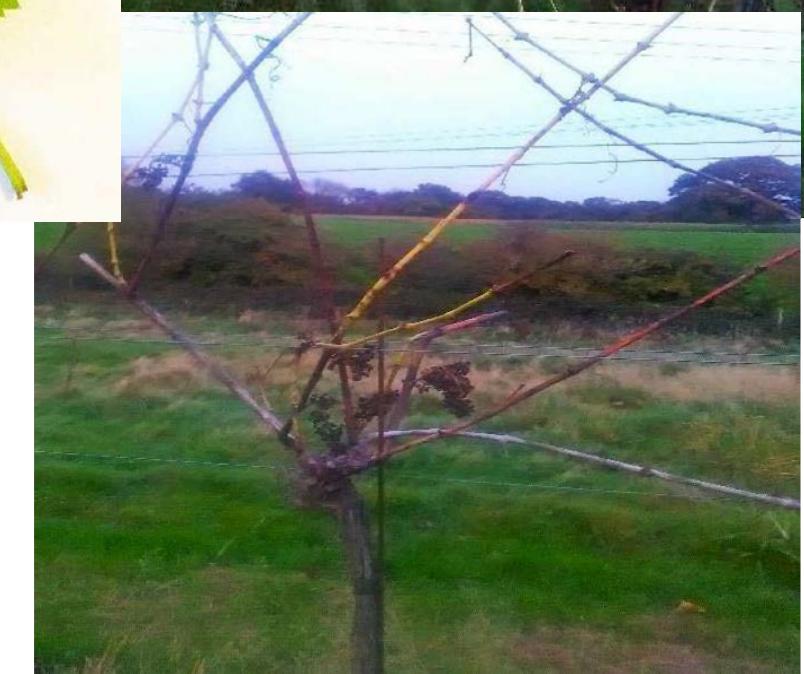
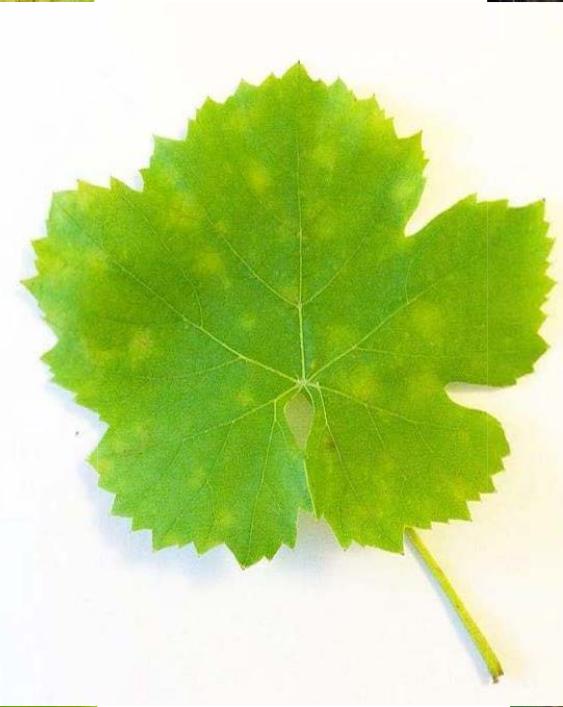
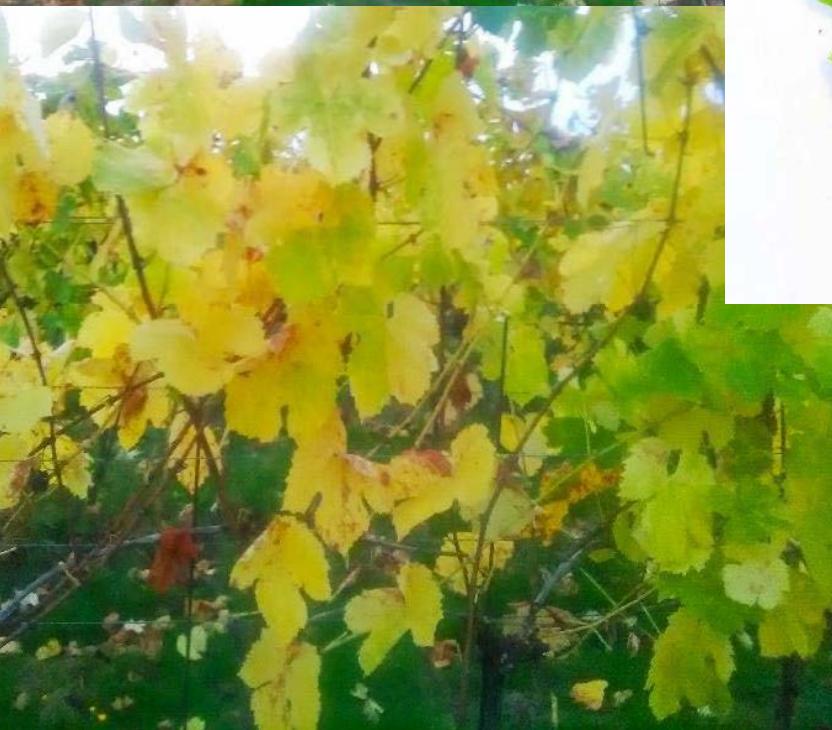


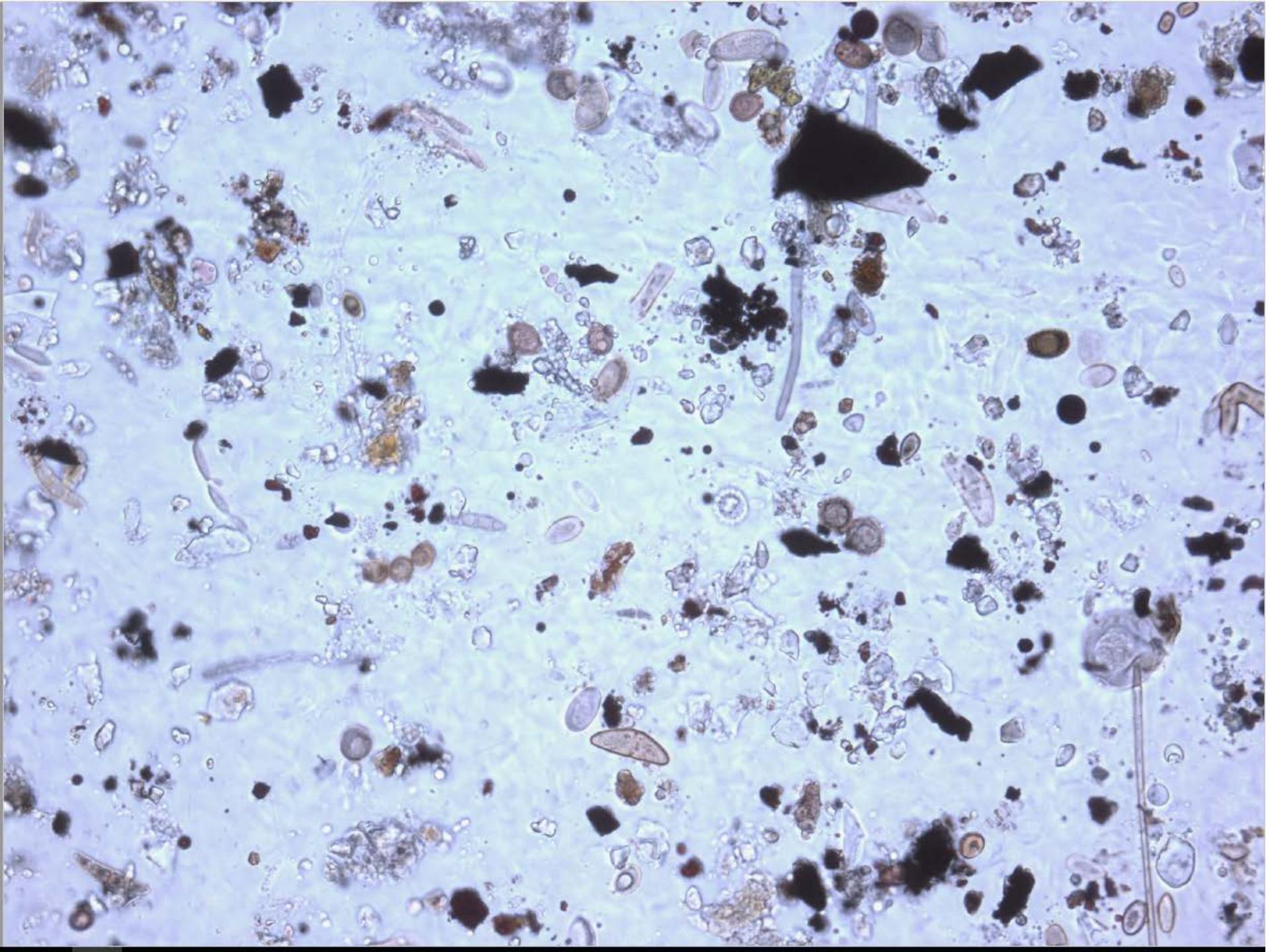
Legend

Average Winkler
<VALUE>

972.68 - 1,001
951.06 - 972.67
934.56 - 951.05
921.95 - 934.55
912.33 - 921.94
904.98 - 912.32
899.37 - 904.97
895.09 - 899.36
889.48 - 895.08
882.13 - 889.47
872.51 - 882.12
859.91 - 872.5
843.4 - 859.9
821.78 - 843.39
793.46 - 821.77

Source : Corentin Cortiula-Phelipot, 2018

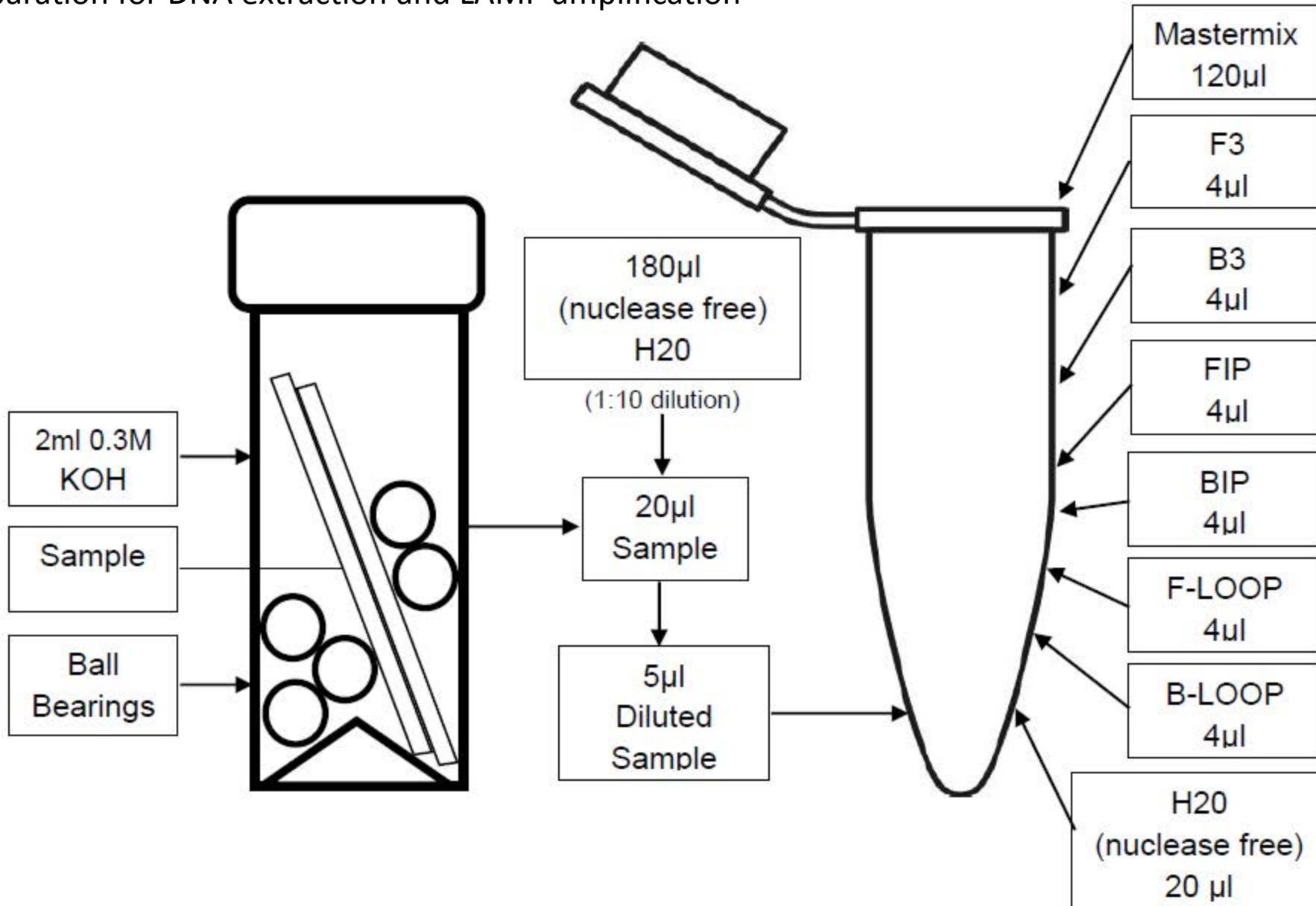




Plasmopara viticola Molecular Primers for LAMP

<i>Plasmopara viticola</i> Primers for LAMP	Sequence Location on the DNA backbone	Target Sequence (5' - 3')
BIP	PvITS	GAATCGGTGAACCGTAGCTATGTAAGCTGCCACTCTACTTCG
FIP	PvITSv2	GAAGCCAACCATAACCGCAAATCGGCGACCAATTATTGCTGTTG
B3	PvITS	CCAAATGGATCGACCCTCG
F3	PvITSv2	GTTTGTCTATTGTGGCCAGTC
B-LOOP	PvITS	GACTATGCTTCAATCAGTT

Sample preparation for DNA extraction and LAMP amplification



Genie II



16 reactions
Single-colour detection

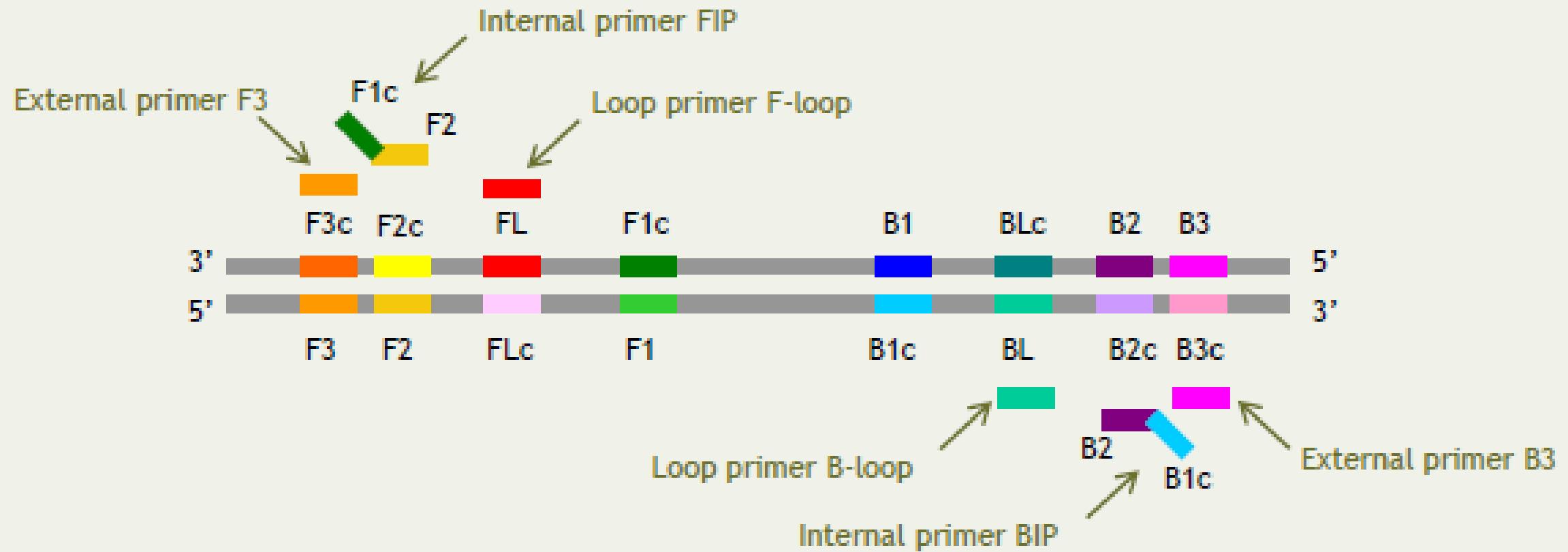
Genie III

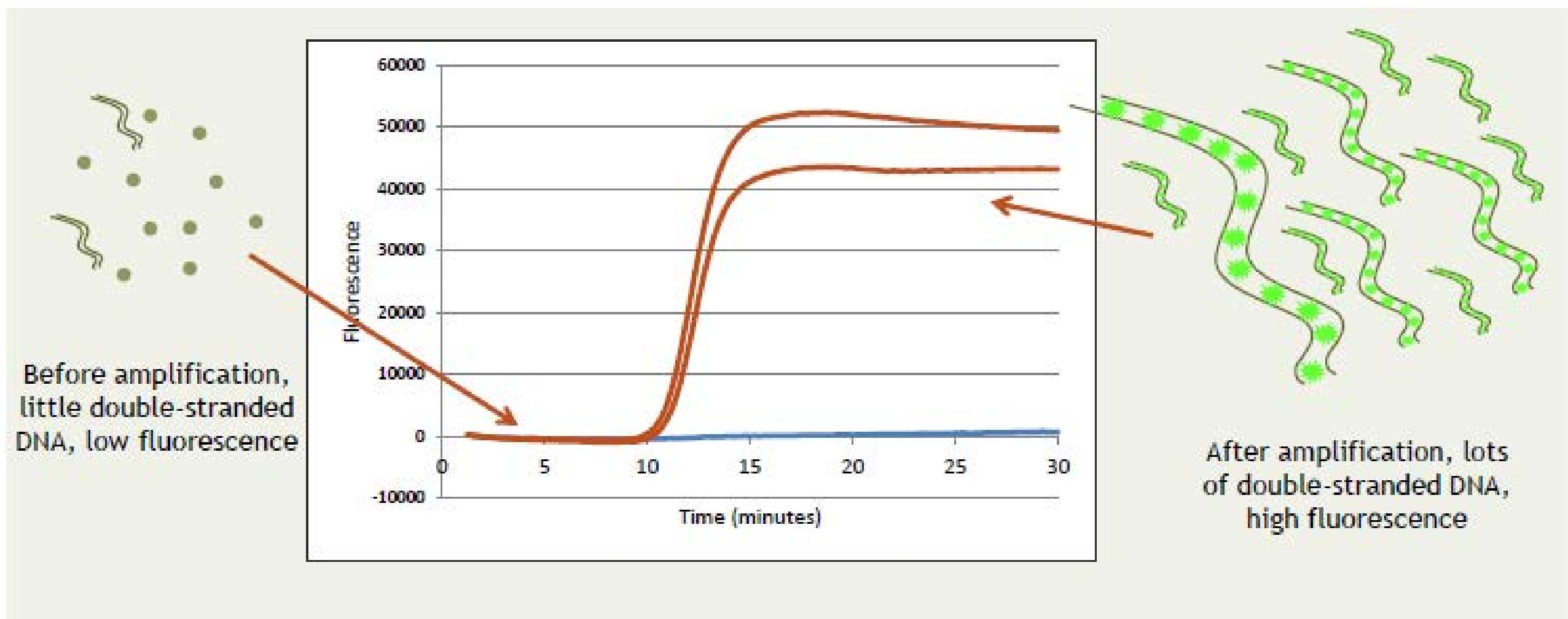


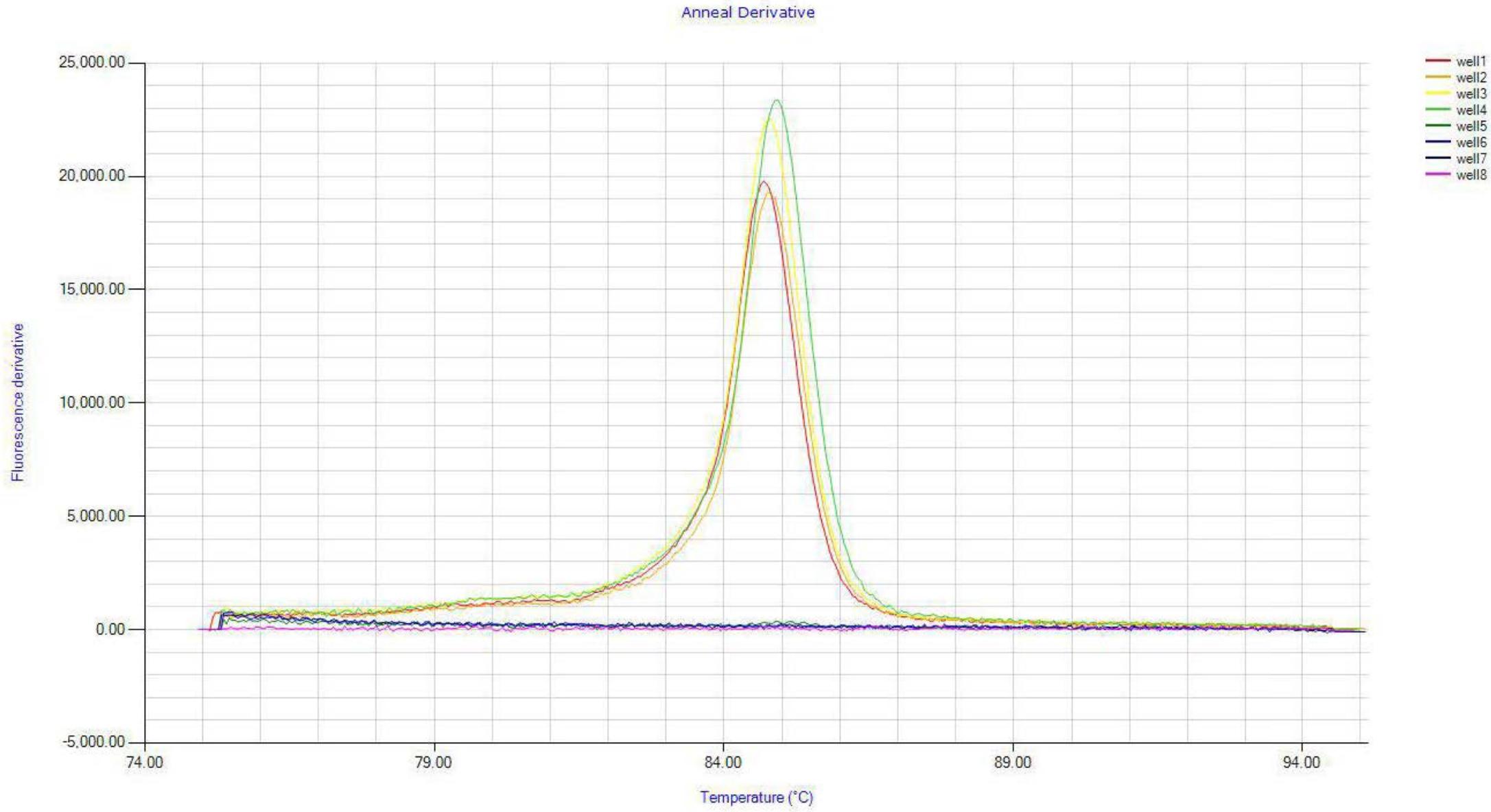
8 reactions
Two-colour detection

OptiGene

OptiSense
LIMITED

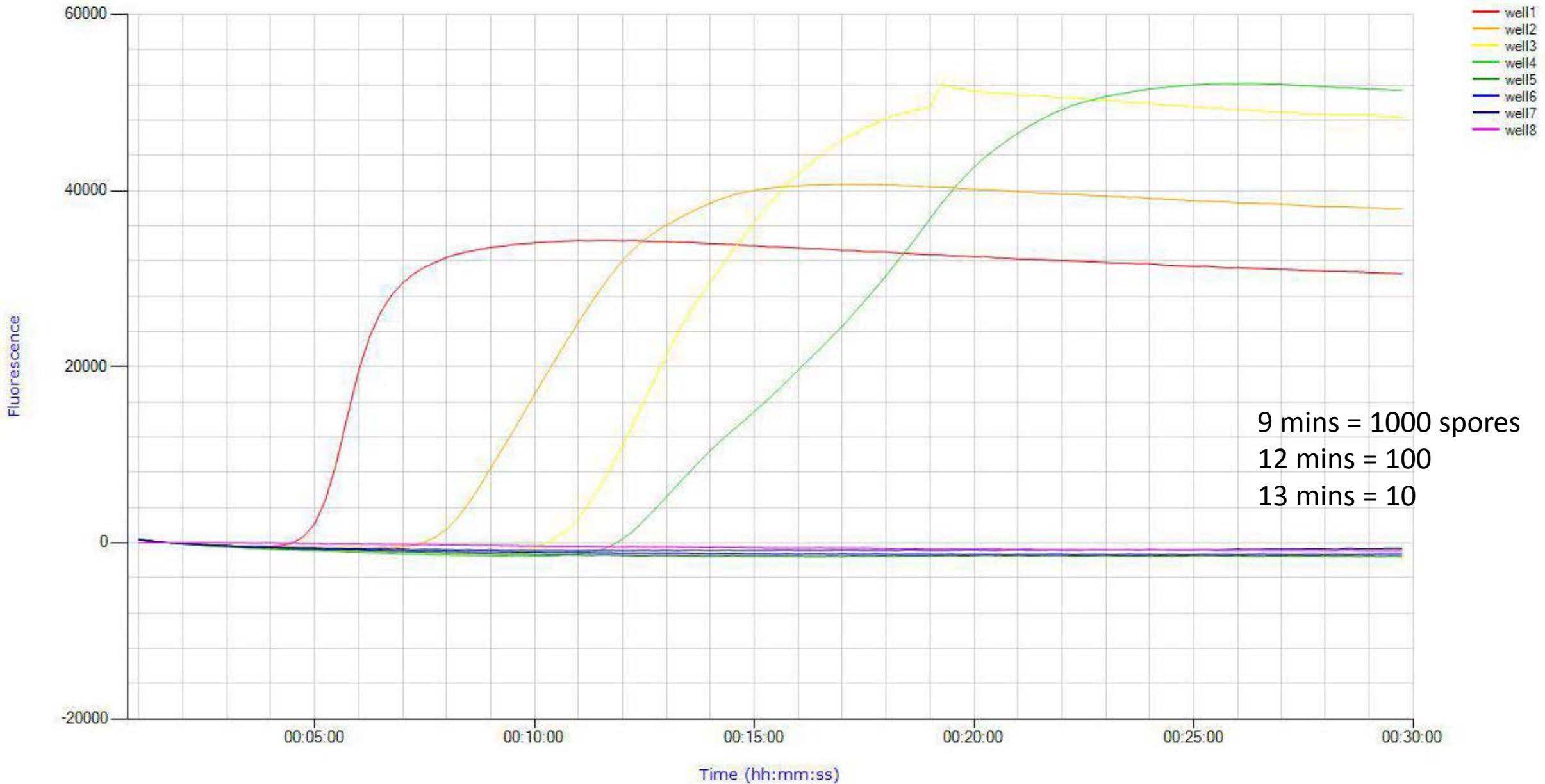


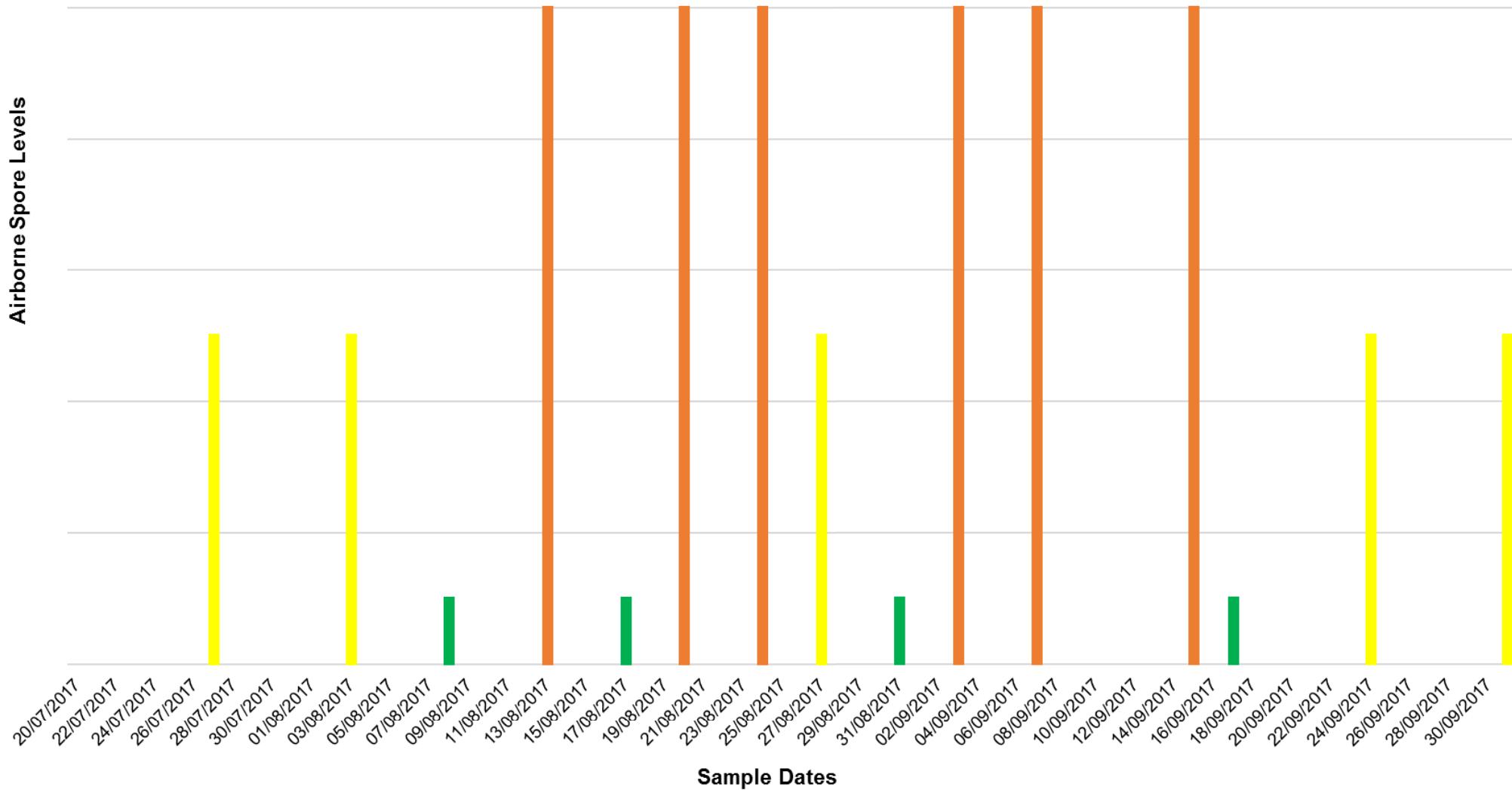




Optimum annealing temperature for fungal spore primers

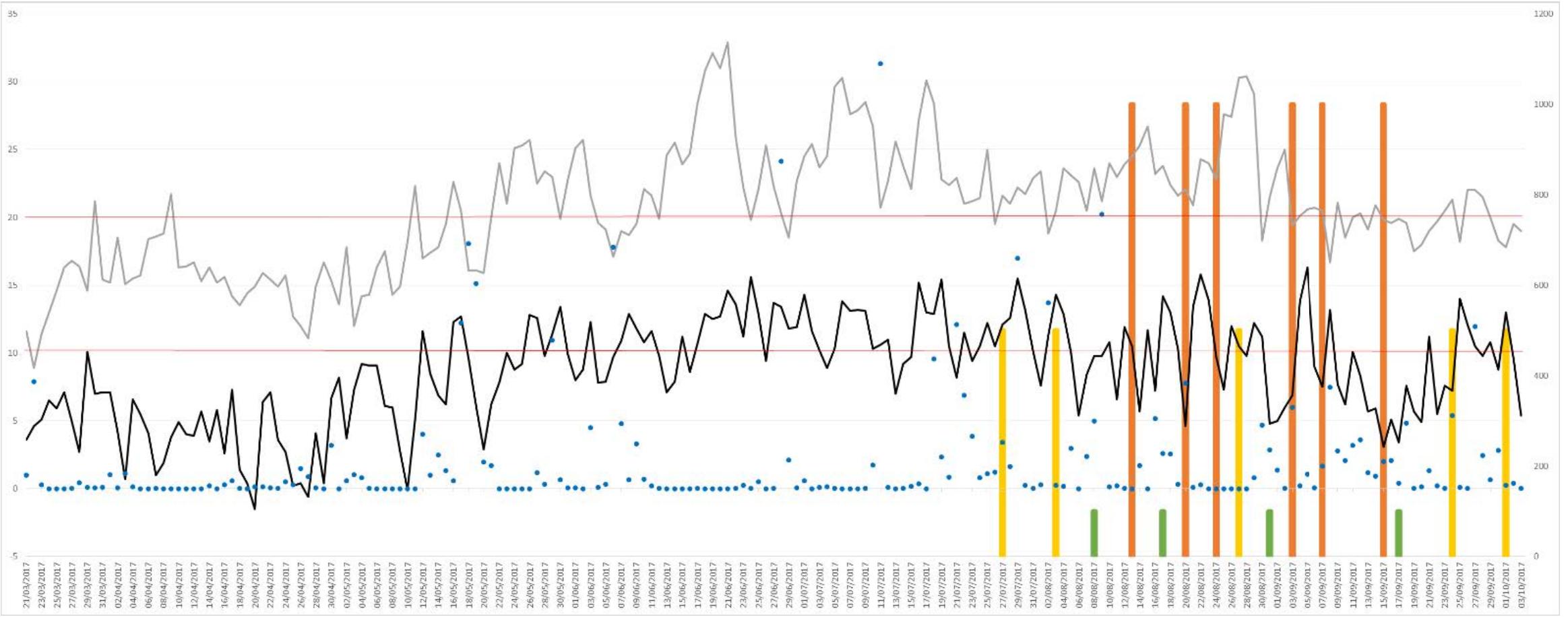
Amplification





Results of 2017 spore trapping/analysis trial at Rock Lodge vineyard

Harte 2018



Correlation between spore monitoring results and rainfall, min & max temperatures?

Harte 2018

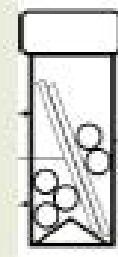
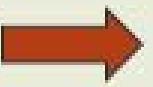
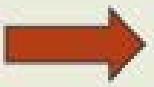


Workshop with growers at
Rock Lodge Vineyard on 20th
February 2018





Spore trap



DNA extraction
of air particulate



LAMP
Result takes 30
minutes

Benefits of this system of monitoring:

- ✓ Easy, but direct measurement (rather than prediction) of disease risk
- ✓ Cost-effective:
 - ✓ Spore sampler 500€
 - ✓ Genie 2 analyser 3000€
 - ✓ Assay reagents 7€
- ✓ Rapid, 'in-field' results (10 mins)
- ✓ Saves on pesticides, fuel, use of machinery, environmental impacts
- ✓ Checks effectiveness of pesticide applications
- ✓ Could be used to distinguish between resistant strains of pathogens
- ✓ Diagnosis of diseases in humans?

With many thanks to:

- Irene Harte Plumpton College
 - Ian Brittain FERA Science
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 - Jenny Tomlison FERA Science
 - Blago Dishkov Plumpton College
 - Corentin Cortiula Plumpton College



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Any questions?

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