

COST Action Final Achievement Report

FA1303: Sustainable control of grapevine trunk diseases (22/10/2013 to 21/10/2017)

The Action was approved by the Committee of Senior Officials (CSO) on 16-5-2013 and has the MoU reference COST 017/13.

This report was submitted on 30-11-2017 by the Action Chair on behalf of the Management Committee in fulfilment of the requirements of the rules for COST Action Management, Monitoring and Final Assessment.

Action leadership and participants

Leadership positions

Position	Name	Contact details	Country of work affiliation
Chair	Prof Florence FONTAINE	florence.fontaine@univ-reims.fr +3336913318	France

Position	Name	Contact details	Country of Nomination
Vice Chair	Dr Josep Armengol	jarmengo@eaf.upv.es +34963879254	Spain

Working groups

#	WG Title	# of participants	WG Leader	Country of nomination
1	Pathogen characterization, detection and epidemiology	67	Dr Cecilia Rego crego@isa.utl.pt	Portugal
2	Microbial ecology	17	Prof Patrice REY patrice.rey@agro-bordeaux.fr	France
3	Host-pathogen and fungus-fungus competitive interactions	51	Dr Eliane ABOU-MANSOUR eliane.abou-mansour@unifr.ch	Switzerland
4	Disease management	65	Dr Stefano Di Marco s.dimarco@ibimet.cnr.it	Italy

Other key leadership positions

Position	Name	Contact details	Country of work affiliation
STSM Coordinator	Prof Laura Mugnai	laura.mugnai@unifi.it	Italy

Participants

COST members having accepted the MoU

AT	20/06/2013	BG	29/11/2013	HR	04/10/2013	CY	05/04/2016	CZ	26/06/2013
FR	14/06/2013	DE	17/06/2013	EL	01/10/2013	HU	17/06/2013	IL	10/11/2013
IT	11/07/2013	MT	13/09/2013	ME	13/10/2015	NL	17/06/2013	PL	02/07/2013
PT	11/09/2013	RO	20/08/2013	SI	25/08/2013	ES	02/06/2013	SE	22/10/2013
CH	03/07/2013	TR	30/09/2014	UK	30/05/2013				

Other participants

Institution Name	Country
Université Saad Dahled de Blida	Algeria
University of Stellenboch	South Africa
University of Montenegro	Montenegro
Armenian academy of viticulture, Wine-making and fruit growing NGO	Armenia

Summary

Main aim/ objective

The main objective of the Action is to improve management and control of GTD by acquiring knowledge on occurrence of pathogens, vine-pathogen interaction, ecology of microorganisms, to develop effective and sustainable management protocols, and to extend these to end users, i.e. vineyard operators and nurserymen.

The Action addressed this as described below

The goal would be to develop a network of European expertise to improve understanding of GTD by acquiring knowledge on occurrence of pathogens (WG1), vine-pathogen interaction (WG3), ecology of wood inhabiting microorganisms (WG2), and to develop new management protocols and biocontrol approaches (WG4).

- WG1: a selection of 17 main pathogens to focus on their characterization; for us, approximately 30 GTD isolates per pathogen collected among members were sent to CBS to create a referent collection for the GTD researcher community. A review on the life cycle of main GTD pathogens has been done and available on the COST website. To isolate and identify easily these pathogens, a training school was organized. For epidemiology of GTD, a survey has been sent to participants of all COST Action countries to obtain a dataset on the incidence of GTD at the European level. The analysis of this dataset was presented during the both COST Action workshops. This dataset will be useful to establish experimental vineyards for GTD incidence analysis over the time. The choice of these experimental vineyards has been possible thanks to the feedback of the survey (choice of the cultivar, rootstock, age).

- WG2: a training school on the global approach to study the grapevine microbiome has been organized; the writing of a standard protocol is in process but basic information are available on the website. Finally, a collect of samples in different European countries such as Israel, Hungary, Italy and Austria started in 2016 and will continue thanks to the GTD free project.

- WG3: the best analysis approaches to use (prote-, metabol- and transcript- omic) and the development of a simple model reproducing stem necrosis with/or without foliar symptoms were discussed. Moreover, a conceptual model of GTDs was presented, a such model is an added value for the COST Action members who participated to its validation and for a H2020 project. For the plant-pathogen interaction, we exchanged on the intra-Vinifera variability to identify resistance mechanisms or be combined with resistance genes identified in wild Vitis species for the development of cultivars with sustainable resistance, and also to identify and understand the phytotoxins activities and involvement on GTD emergence.

- WG4: to manage GTDs in nursery, a survey on the grapevine propagation process has been sent to the main nurseries in each European COST countries and results were presented during the COST Action workshop in Cognac (2015) and a scientific paper was written. The next step which is in process is the writing of guidelines for nurserymen. As the survey underlined a lack on the research and the potential use of biocontrol agents in nursery, a special care was done. For the vineyard management, a survey was elaborated which was sent to vine-growers to have a feedback on the viticultural practices done to manage GTDs. This WG is strongly linked to end-users and companies, and also to the Winetwork project (H2020). Synthesis of discussions during round tables of WG meetings are available on COST Action website.

Action website

<http://managtd.eu/>

Achievement of MoU objectives, deliverables and additional outputs/ achievements

MoU objectives

The Action had the following specific objectives:

MoU objective	Level of achievement	Further information (hyperlink or other)
Create a network of multidisciplinary scientific institutes and companies, to improve understanding of GTD by increasing disease data collection and developing standardizing methodologies	76 - 100%	WGs 1 & 2 meeting in budapest 2015 (http://managtd.eu), published paper in <i>Phytopathologia Mediterranea</i> Gramaje & Di Marco 2015 (www.fupress.net), and the oral communication at the Cognac (2015) and Reims (2017) workshops
Develop management strategies to decrease the impact of GTD through interactions between researchers and the industry operatives. This will depend on interaction between plant pathologists, microbiologists, microbial ecologists, chemists, biometeorologists and vine physiologists, etc., gathered in this proposal, with institutes and organizations advising grape growers and with the nursery companies.	76 - 100%	During the COST Action, 2 surveys were done at European level countries to identify management strategies in nurseries and vineyards. Data of the nursery survey was published (Gramaje & Di Marco, 2015), the other one is in process. Data were presented to the end-users during at 2 workshops (Cognac and Reims) and during WG meetings (Bordeaux, 2015; Logrono, 2016). Lectures were available on the COST Action website.
Establish a platform for scientists to communicate new information about the extent of and control of GTD. The strength of this proposal is the wide range of scientific disciplines gathered, and their geographic hence climatic spread, to understand the problem, and to develop sustainable control strategies.	51 - 75%	Thanks to the working groups and the round tables organized during these WGs meetings, referent persons to collect data on GTD spread, management strategies in vineyard or in nursery, to collect strains of various pathogens all other the european countries and so on were identified. Presently, members of this COST Action contribute with OIV to write guidelines for nursery management. Some of them were also implied in the ISIB2- Winetwork project that the main goal was to transfer strategies to control GTDs in both nursery and vineyard (http://www.winetwork.eu).
Understanding the factors involved in the expression of the different GTD	76 - 100%	In some of European countries affected by GTDs and members of the COST Action, survey in vineyards were initiated in order to collect statistical data on the GTD expression and to identify factors (biotic and abiotic) involved in their expression. A part of this research integrates the GTDfree project in which several european partners are associated (italy, spain, austria, israel, hungary,...); this project managed by INRA (french research institue) was financial supported by Hennessy company and french ministry; Hennessy company co-organized with the COST Action the first workshop in cognac in 2015 and after that, to support the research on GTDs understanding.
Establish standard protocols for detection and identification of pathogens implicated in GTD.	76 - 100%	A first training school was done in February 2015 (Bordeaux) to transfer a standardize protocols for the collection and the identification of microbial communities (bacteria and fungi). To complete and close this training, a second training school was organized in June 2016 (Valencia) on

		isolation and identification of GTD pathogens. Thanks to these 2 training schools (lectures available on http://www.managtd.eu), most of the institute members were able to use the same protocols. A commun COST Action members paper is under writing.
Develop tools to track specific fungi.	76 - 100%	To track specific fungi, a lecture with an exhibition on two tools was done: the mycorray technology which could be able to identify 11 GTD pathogens (http://www.mycorray.eu/mycorray-presented-in-the-cost-meeting-in-budapest/) and the LAMP tools presented by FERA institut (see the COST Website, meeting in Vienna – Feb. 2016). These tools are robust, easy to use, rapid, portability and low cost. The study was done to valid the sensitivity for 11 pathogens by 12 UE lab COST members and the experimentation was successful. The data were presented by Woodall et al (july 2017) at the 10th IWGTD in Reims and a paper is under writing.
Coordinate multi-site evaluation trials at different levels: regions, cultivars, cultivars/rootstock combination, training system, soil, treatments and their applications.	76 - 100%	In 2015, two UE surveys (including neighboring countries) were managed by L. Mugnai and L. Guérin-Dubrana. A draft of the results was presented in the Cognac workshop (June 2015) and the global analysis was presented in the Vienna meeting (Feb. 2016, http://managtd.eu/). The main conclusions are added value for the a H2020 proposal. Data were presented at the 10th IWGTD in Reims (july 2017) and a paper is under process. These 2 persons were identified as referent person to manage survey on the spread of GTDs, and people know they can contact them. New surveys were established in european countries during and thanks to this COST Action. Moreover, a review on GTDs managed by OIV (M. De La Fuente) in collaboration with members of this COST Action was edited by OIV publication (2016, ISBN : 979-10-91799-60-7)
Adopt the use of UAV (Unmanned Aerial Vehicles), and remote sensing with groundtruthing for the detection of spatial distribution and development of GTD, and also to assess the scale of the problem, which is as yet unknown.	51 - 75%	As the use of UAV is increasingly effective, the Italian team developing this tool gave a lecture on the WG3 meeting in Cluj-Napoca to the COST Action members (Romania, May 2016). This kind of tool is both expensive and sensitive; it could be used only when people are able to recognize GTD foliar symptoms. No more works were done to develop this technic under in developing.
Develop and test new prediction models (through the centralization of multi-site data) concerning the impact of soil and climate conditions in GTD expression.	76 - 100%	A part of these data was obtained in the UE surveys of GTD incidence (see objectif MoU n°4). Moreover, the French professional institute (IFV) managed the development of conceptual model of GTDs in collaboration with COST Action members; it's a systemic approach to GTDs for a global view of the problem (a paper is in process). The developer of this model exchanged with several COST Action members during the workshop in Cognac (2015) to have data to build the model. He gave a lecture during the WG3 meeting in Cluj-Napoca to present the main achievements and also at the 10th IWGTD in Reims (July 2017); this model will be a added value for a H2020 project.

<p>Standardize and validate a simplified model for symptoms development in grapevine under controlled conditions.</p>	<p>76 - 100%</p>	<p>During the meeting in Athens (WG3, May 2015), simple models for pathogens associated to eutypa dieback and esca were presented; the last simple model with Botryosphaeriaceae was presented in Vienna (WGs1&2, Feb. 2016). After that, a standard protocol according to the pathogens was validated by COST members during round table. A paper which summarized the various models according to GTDs diseases is in process among several COST Action members.</p>
<p>Set up common and agreed protocols and techniques to optimize the selection and use of physiological and molecular markers.</p>	<p>76 - 100%</p>	<p>Different studies are in process, as there are global approaches by proteomic, metabolomic and transcriptomic analyses, we need time to identify markers for dissemination. For the first COST year, we focused on target gene markers, the second year on enzyme markers and for the third year, on toxin markers (see lecture on WGs meeting available website http://www.managtd.eu). With this panel of markers, we hope to identify for recommendation some makers but this mission will be difficult due to their specificity to a cultivar which are different according to UE countries. Thanks to the GTD free project (french Hennessy project in collaboration with several european partners), studies on various cultivars in different european countries are started in 2016, until 2020.</p>
<p>Clarify plant defence reactions involved in affected vines to stimulate vine immunity.</p>	<p>76 - 100%</p>	<p>This objective could be easier studied with the availability of simple models (objectif MoU n°7); nevertheless, to have more knowledge on this topic, the first 2 years of the COST Action we had difficulties to invite specialized people on this topic. For this objective, we could underline that lots of STSM focused on this topic, showing the interest and the gap of knowledge. During the 4 years, the labs developing these tools were identified and collaboration were established. But, keep in mind that the expensive cost of such analysis limited the number of studies.</p>
<p>Generate new models for in vitro interaction studies of plant cell cultures and fungi, as a method to expedite whole plant studies.</p>	<p>76 - 100%</p>	<p>New models, suspension cells, calli and <i>in vitro</i> plantlets, were presented and available in various labs. The next step, which is in process, is to write a standard protocol which will be disseminated to the COST Action members.</p>
<p>Developing new management strategies</p>	<p>76 - 100%</p>	<p>In both nurseries and vineyard, new strategies were tested in several european countries such as the use of biocontrol agent, the use of natural compounds in combination or not with biocontrol agents. At several WGs, lectures were given on these strategies by experts (WGs in Bordeaux, 2015, in Logrono, 2016; in Bologna 2017) in order to give an overview to everybody on the potential of these new strategies.</p> <p>All these data were presented at the 10th IWGTD at Reims (july 2017) and were disseminated during the 4 years of the COST Action at regional seminar to end-users.</p>
<p>Harmonize experiments evaluating new environment friendly and sustainable strategies to</p>	<p>76 - 100%</p>	<p>Following the survey in nurseries, end-users underlined that there are researches on the</p>

manage GTD in the EU.		potential use biocontrol agents (BCAs) but they are few feedback by researchers on this topic. Consequently, WG4 members decided in Bordeaux (Oct. 2015) to focus the next WG4 (Logroño, Oct. 2016) on the research on BCAs. To optimize the discussion, end-users and firms were invited. During the round table, the discussion to harmonize protocols was managed. A part of these knowledge were directly transferred to the ISIB2-winetwork project focusing on GTDs management.
Promote new approaches to control GTD in both nurseries and vineyards.	76 - 100%	<p>In nurseries, a survey was managed the last year and the main conclusions were presented during the COST Action workshop in Cognac (http://managtd.eu/) and were published in a scientific paper in 2015 (Gramaje & Di Marco, Phyto. Med., 2015). During the WG4 (Bordeaux, Oct. 2015), a guideline for nurseries was proposed to the MC members, this document is in process.</p> <p>In vineyard, a survey was elaborated during the WG4 meeting in Bordeaux (Oct. 2015) and then sent to UE countries in 2016. A synthesis was presented to the next WG4 meeting in Logrono, Oct. 2016 and at the 10th IWGTD (July 2017, Reims).</p>
Propose new recommendations to limit the progression of grapevine decline to European end-users.	76 - 100%	It is too early to produce a definitive list of recommendations. We need to collect again data for that. However, the writing of guidelines for nurseryman is in process in collaboration by OIV, nurseryman and COST Action members. These guidelines will be presented to the next OIV expert meeting the next year in Paris (2018).
Conduct Short-Term Scientific Missions (STMS) and Training Schools involving universities and grapevine institutions involved with viticulture to provide post-graduate students and early career scientists with new insights into GTD including viticulture, laboratory and field research skills.	76 - 100%	Two training schools were done for that and were successful (http://www.managtd.eu/): the first in February 2015 at Bordeaux INRA (France) on the identification of microbial community and the second one in June 2016 at University of Valencia (Spain) on the identification of GTDs pathogens. Moreover, 20 applicants from 7 european countries participated to STSMs. Several results were obtained and most of them were presented at the 10th IWGTD (Reims, July 2017) and papers were published or under writing. Thanks to these tools, new collaborations between labs were established.
Disseminate results throughout publications of all meeting proceedings using contact lists of affiliated organizations, popular and trade press articles, and by establishing a dedicated and user friendly website.	76 - 100%	All the knowledge acquired during the COST Action were disseminated by the website (http://www.managtd.eu/); through another european project, the winetwork project (ISIB2-H2020), by the 2 workshops co-organized by the COST Action (Cognac in 2015, 80 participants, and Reims in 2017). In Reims workshop, 240 people were present from 29 countries, and several company and end-users were represented to transfer all the knowledges obtained during the last 4 years. Most of the lecture gave at the WG meetings were available on the COST Action web site and also most of the posters presented at the 10th IWGTD (July 2017,

Reims).

Proceedings were published in a scientific journal (Phytopathologia mediterranea) and also in grey literature like Phytoma, Vitis for exemple (french journal).

Deliverables

The Action reported the following deliverables:

Deliverable	Timing of deliverable	Further information (hyperlink or other)
Create an inventory of cultures help in UE labs	Delivered	Several isolates were sent to CBS in collaboration with P. Crous
Develop a set diagnostic protocols for identification,	Delivered	2 trainings schools, inter-lab comparison of DNA barcoding protocols: WG1 meetings & 10th IWGTD (http://managtd.eu)
An article on the life cycle of pathogens,	Delivered	http://managtd.eu
A list of the most important pathogens,	Delivered	http://managtd.eu (WG1 meeting); 17 pathogens were selected and 30 isolates per pathogen were collected and sent to CBS (P. Crous collaboration)
8- Characterize plant defense reaction, and 9- Understand pathogen infection,	Delivered	http://managtd.eu (WG2 meeting, Budapest); STSMs on microscopy tools available to understand pathogens infections; paper Fontaine et al. 2015 (EJPP) focused on plant defense reaction to GTDs infection
An inventory of the presence and spread of the different GTDs through surveys and multi-site monitoring	Delivered	http://managtd.eu (WG2 meeting, Vienna); 2 surveys conducted; paper under submission Guerin-Dubrana et al (2018, Phytopathologia Mediterranea); paper OIV with COST Action members De la Fuente et al., 2016
Have a general picture of the grapevine propagation process.	Delivered	http://managtd.eu , Workshop in Cognac, paper Gramaje & Di Marco 2015 Photo. Med. (http://www.fupress.net)
Guidelines/protocol for evaluation of the activity of a treatment	Not delivered, but foreseen within 2 years	http://managtd.eu , and guidelines on good practices in nursery are in writing managed by OIV and experts (some of them are COST Action members)

Additional outputs/ achievements

N/A

Projects

N/A

Other outputs / achievements

N/A

Impacts

The Action reported the following impact(s):

Description of the impact, i.e. what will change, and for whom, as a result of what the Action achieved	Type of impact	Timing of impact
Several seminars given by COST Action members in their countries to end-users	<ul style="list-style-type: none"> • Economic 	Achieved
2 Workshops organizer	<ul style="list-style-type: none"> • Scientific / Technological 	Achieved
"Assemblée National" meeting, 2 deputies, Paris, 2015	<ul style="list-style-type: none"> • Economic • Societal 	Achieved
7 COST Action members involved in Winetwork project	<ul style="list-style-type: none"> • Scientific / Technological • Economic 	Achieved
EIP-agri expert on crop diseases for COST Action members	<ul style="list-style-type: none"> • Scientific / Technological • Societal 	Achieved
Meeting at CopaCogeca (common agriculture policy), February 2014, Bruxelles	<ul style="list-style-type: none"> • Economic 	Foreseen within two years
Meeting between the COST Action chair and OIV; July, 20, 2015; this relationship was substantiated by the co-organization of the 10th IWGTD, Reims, 2017, between University of Reims Champagne-Ardenne / COST Action and OIV; and also the writing of OIV guidelines to control GTDs in nurseries (in process)	<ul style="list-style-type: none"> • Economic 	Foreseen within two years
OIV expert	<ul style="list-style-type: none"> • Scientific / Technological 	Foreseen within two years
COST Action members as ICGTD members	<ul style="list-style-type: none"> • Scientific / Technological 	Foreseen two-to-five years
New collaborations by Interreg, PHC project, H2020, PhD in cotutelle, others	<ul style="list-style-type: none"> • Scientific / Technological • Economic 	Foreseen two-to-five years
Reinforce relationships and collaboration between academic institute, company and end-users	<ul style="list-style-type: none"> • Scientific / Technological • Economic 	Foreseen two-to-five years

	<ul style="list-style-type: none"> • Societal 	
To highlight the importance of GTDs by creation of "Plan Dépérissement" in France	<ul style="list-style-type: none"> • Scientific / Technological • Economic • Societal 	Foreseen two-to-five years
Hennessy & Jas call for GTDs research program, funds of 600000€	<ul style="list-style-type: none"> • Scientific / Technological • Economic • Societal 	Foreseen two-to-five years

Dissemination and exploitation of Action results

Dissemination and exploitation approach of the Action

The Action's dissemination and exploitation approach as well as all activities undertaken to ensure dissemination and exploitation of Action results and the outcomes of these activities are described below.

Process to validate the identification of some GTD pathogens by DNA barcoding; study has been done during the COST Action by 14 laboratories from 7 UE countries. The next step will be to extend this technic to others labs.

Dissemination meetings funded by the Action

The Action funded Dissemination Meetings as shown below:

Title	XVI International Congress on Molecular Plant-Microbe Interactions (MPMI)		
Date	06-07-2014 to 10-07-2014	Country	Greece
Event	XVI International Congress on MPMI		

Title	9th International Workshop on Grapevine Trunk Diseases (9IWGTD)		
Date	18-11-2014 to 20-11-2014	Country	Australia
Event	International workshop on grapevine trunk diseases, this workshop is organized every 2 years in the worldwide		

Other dissemination activities

The Action also undertook the following dissemination activities:

Activity	9th IWGTD - Adelaide, Atralie, 2014, Fontaine F, Armengol J and collaborators of COST Action 2014. Sustainable control of grapevine trunk diseases. Poster
Target	scientific and end-users
Outcome	news partners have been subscribed to the COST Action and also audience remarked that scientific GTD community was dynamic
Link	lcgtd.ucr.edu

Activity	Sandor E, Fontaine F, Armengol J and collaborators of COST Action 2014. Sustainable control of grapevine trunk diseases. 12th European conf�rence on fungal genetics – ECFG12, Seville (Espagne). Poster
Target	scitenfic
Outcome	promotion of the COST Action networking
Link	www.ecfg12.com

Activity	IWFGT, Eger (Hongary), 2015, Fontaine F, Armengol J and collaborators of COST Action 2014. Sustainable control of grapevine trunk diseases.
Target	scientific and end-users
Outcome	promote the COST Action and disseminate knowledges on GTDs

Link	grapevine.uni-eger.hu
Activity	First COST Action Workshop on Grapevine trunk diseases, Cognac, France, 23-24 June 2015
Target	80 participants, scientific, end-users and company of wine
Outcome	an important promotion of the COST Action, news subscribers to the COST Action, a dynamic networking group on GTDs
Link	http://managtd.eu/
Activity	10th International Workshop on Grapevine Trunk Diseases, Reims (France), 4-7 July 2017
Target	scientific, private company, end-users, OIV members : 240 peoples from 29 countries
Outcome	creation of new collaborations, several lectures and posters directly linked to the data obtained with the STMS of the COST Action and of the collaboration developed during the COST Action and linked to this COST Action
Link	http://managtd.eu/
Activity	Meeting in "Assemblée Nationale", Paris, France; Report n°2946 "Les maladies de la vigne et du bois"
Target	Professional and policy
Outcome	Promote the COST Action and raise awareness to the GTDs spread to obtain funds
Link	www.assemblee-nationale.fr
Activity	Seminar – University Bayer Day, Paris, France, 2015, given by COST Action members including C. Rego, L. Mugnai, S. Di Marco, Fontaine F, Larignon P
Target	ends-users
Outcome	promote the COST Action and the several activities and researchers leading on GTDs at european level
Link	no link
Activity	Bruxelles, Copa Cogeca, 2014, Lectures by COST Action members (J. Armengol, L; Mugnai, C. Rego, K., Vaczy, C. Rego, Fontaine F) on the spread and incidence of GTDs in Europe and in the worldwide
Target	policy
Outcome	to try to explain the urgency to obtain funds from EU to help research on GTDs control
Link	www.copa-cogeca.be
Activity	Seminar, Végépolys, Angers, France, 2014, Presentation of the COST Action mission
Target	scientific and private company which are potential financer for the GTDs research
Outcome	explain the missions of the COST Action and transfer knowledges on GTDs
Link	no link
Activity	Seminar, Tokay wine institute, Debrecen, Eger college, Hungary, 2014
Target	Scientific and professional
Outcome	Presentation of COST Action mission
Link	no link
Activity	

	Paper, Eger College, Hungary 2014; Proceeding, p53-58
Target	International strategies in higher education
Outcome	Presentation of COST Action mission
Link	no link

Activity	10th Symposium Vitiviniculture, Alentejo, June 2016, Portugal
Target	Scientific and professional
Outcome	dissemination
Link	https://www.ateva.pt/10-simposio-de-vitivinicultura-doalentejo_/

Activity	Overview on GTDs and their management in nursery and vineyard. Lecture given in UE countries by COST Action members: A. Kortekamp in Germany, P. Lecomte & P. Larignon & F. Fontaine in France, D. Gramaje & J. Armengol in Spain, C. Rego in Portugal, L. Mugnai & S. Di Marco & G. Romanazzi in Italy, E. Karaffa & K. Vaczy in Hungary; S. Compant in Austria
Target	End-users and company
Outcome	Disseminate knowledge on GTDs, explain that GTDs is an UE problems and that there is a dynamic group working on these diseases.
Link	http://www.dlr-rheinpfalz.rlp.de http://www.maladie-du-bois-vigne.fr/ https://ebt.uni-eszterhazy.hu/en

Exploitation activities

The Action undertook the following activities to ensure exploitation (use, in particular in a commercial context) of the Action's achievements:

No input provided by the Action

Action Success(es)

The Action's two most significant successes were the following:

- 10th International Workshop on GTDs, Reims, 4-7 July 2017, co-organized by University of Reims Champagne-Ardenne, COST Action FA1303 and OIV, 240 participants from the worldwide. Several lectures and posters were presented by COST Action members.
- The submission of a project entitled "GTD control" to the call H2020-SFS10-2017; 21 partners from worldwide especially UE countries involved in COST Action FA 1303.

Action Expenditure

The table below shows the budget allocated to the Action for each Grant Period:

#	Grant Period	Start Date	End Date	Budget allocated to Action (EUR)
1	CAGA-FA1303-1	1-1-2014	30-11-2014	124,000.00 (EUR)
2	CGA-FA1303-2	2-12-2014	31-8-2015	97,991.50 (EUR)
3	CGA-FA1303-2B	1-9-2015	30-4-2016	76,326.08 (EUR)
4	AGA-FA1303-4	1-5-2016	30-4-2017	110,975.00 (EUR)
5	AGA-FA1303-5	1-5-2017	21-10-2017	85,300.00 (EUR)