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# PLANTFOODSEC NEWS

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# EDITORIAL



Jacqueline Fletcher, OSU  
WP2 Leader

The Plant and Food Biosecurity Network of Excellence continues to be highly successful in promoting collaboration among EU member states and associated nations, with a focus on identifying and characterising the nature of security threats to crops in the region. However, in addition to conducting crop biosecurity research on priority issues identified in an earlier project, PLANTFOODSEC has an important new focus: food safety and biosecurity. The connections between food safety – particularly in relation to plant-based foods –

and plant pathology are obvious. Plant pathologists, who investigate microbe–plant interactions with the aim of reducing the incidence of disease and yield/quality impacts, are increasingly applying their expertise to answer critical questions about the fate of human pathogens, such as *Salmonella* and pathogenic *E. coli*, on plants in the field and during harvest, packaging, processing, shipping and storage. Several serious incidents of foodborne illness in the United States in the mid-2000s (*E. coli* O157:H7 in spinach, *Salmonella* in peppers) set the stage for plant pathologists and food microbiologists to work together to seek ways to protect crops from human pathogen contamination and to develop rapid and effective detection, traceback and recovery systems to deal with incidents of foodborne illness.

The expertise of partners from the National Institute for Microbial Forensics and Food and Agricultural Biosecurity at Oklahoma State University (OSU) in the US, a blend of plant pathology and microbial forensics, brings a unique perspective that complements the expertise of other WP2 partners in achieving PLANTFOODSEC goals. The threat of produce contamination in the EU was highlighted acutely in 2011, when an extensive outbreak of serious illnesses in Germany was attributed to a rare strain of *E. coli* O104 and linked to contaminated sprouts from imported seeds. The experiences associated with outbreak investigation, contamination traceback, medical countermeasures, industrial issues and compensation, public concern and media demands all emphasise

the importance of strengthening EU capabilities and resources to prevent outbreaks of foodborne illness and to minimise their impact. The PLANTFOODSEC project combines the expertise of plant pathologists and food microbiologists to address newly emerging EU needs in relation to produce safety. Submitted prior to the *E. coli* O104-linked illness outbreak, our WP2 objectives do not address that incident directly. However, post-outbreak, our European Commission advisors requested that we examine how our work and its outputs can help to mitigate the impacts of the German outbreak, and support ongoing efforts to strengthen EU networks for food safety preparedness, response and recovery.

## UPCOMING EVENTS

Brussels (Belgium), February 7, 2013



### PLANTFOODSEC researchers meet EU institutions

Project partners will organise an awareness-raising workshop in Brussels for stakeholders and end users, immediately prior to the consortium meeting in Paris. The roundtable with selected speakers will target relevant EU officials and MEPs with an interest in research and security issues, with the aim of underlining the importance of research in biosecurity at EU level.

For more information, please visit [http://www.plantfoodsec.eu/latest-news\\_article.php?id=226&t=L&s=](http://www.plantfoodsec.eu/latest-news_article.php?id=226&t=L&s=)

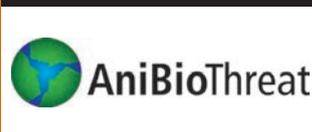
Paris (France), February 8–10, 2013



### Fifth PLANTFOODSEC consortium meeting

Regular consortium meetings take place every six months and are an effective way for partners to share project results. Consortium partner INRA, the French National Institute for Agricultural Research, will host the fifth meeting, which will include group sessions for the individual work packages, a Steering Committee meeting, and the first evaluation workshop on the basis of the first reporting review. On the second day, experts from the Fusarium working group will come together.

Uppsala (Sweden), April 23–26, 2013



### AniBioThreat project

The AniBioThreat project, funded by the “Prevention of and Fight against Crime” programme of the EU Directorate General Home Affairs, is organising an event to improve responses to animal bioterrorism threats and crimes related to these threats. The project deals with bio-preparedness measures concerning the prevention and detection of, and response to, animal bio-threats. The event will focus on responses to animal bioterrorism incidents, decision-making processes among first responders and other stakeholders, harmonised contingency plans related to biological incidents, and bridging between the different authorities that respond to acts of bioterrorism. The final AniBioThreat project conference will be held in Brussels on September 10–12, 2013.

For more information, please visit <http://www.anibiothreat.com>

Beijing (China), August 25–31, 2013



### The PLANTFOODSEC mid-term workshop at ICPP 2013

The International Congress of Plant Pathology (ICPP) is organised every five years and represents a unique opportunity for researchers from all over the world to meet and discuss the latest research results. The theme for the 10th congress, ICPP2013, is “Bio-security, Food Safety and Plant Pathology: The Role of Plant Pathology in a Globalized Economy”. PLANTFOODSEC project members will participate in concurrent session C45, addressing various topics ranging from international cooperation and communication, to the identification of deliberate contamination, platforms for collaborative diagnostics, and the misuse of scientific research. In addition, the congress will provide a forum for the dissemination of the latest deliverables from the PLANTFOODSEC consortium.

<http://www.icppbj2013.org/>

## EUROPEAN/GLOBAL NEWS REVIEW

## Emergency response in plant health – Ash dieback in the UK



Infection with the fungus *Chalara fraxinea* results in leaf loss and crown dieback.

The recent outbreak of ash dieback in the UK has illustrated the need for swift and organised emergency response in the case of disease outbreaks, whether accidental or deliberately caused. The ash (*Fraxinus spp.*) is a very important tree in the UK landscape, and following fears about the loss of trees such as native oaks and larch because of the recent introduction of *Phytophthora ramorum*, *P. kernoviae* and other tree diseases and insect pests, the preservation of tree health has assumed a far higher profile in the UK. Ash trees suspected of being infected with *Chalara fraxinea* were first reported to be dying in large numbers in Poland in 1992.

From 2002 onwards, the disease was reported to be spreading more

widely across Europe. Trees attacked included forest trees, trees in urban spaces such as parks and gardens, and also young trees in nurseries ([www.forestry.gov.uk/chalara](http://www.forestry.gov.uk/chalara)). In February 2012, *C. fraxinea* was found in a consignment of infected trees sent to a nursery in England. Since then, it has been found in a number of locations in the UK mainly associated with the nursery trade. Partners at the Food and Environment Research Agency (FERA) and Imperial College London have contributed to developing the response to ash dieback and other tree health emergencies in the UK. However, in October 2012, FERA scientists confirmed a small number of cases in East Anglia in ash trees at sites in the wider natural environment, including established woodland, which do not appear to have any association with recently supplied nursery stock. Similar finds were confirmed in other counties in early November 2012.

Although *C. fraxinea* is not listed as prohibited in EU Directive 2000/29/EC or related legislation, it is being treated as a quarantine pest under national emergency measures. These require outbreaks to be reported and enables eradication and containment actions to be imposed to control the disease. They also include the provision of funding for surveys. Imports of *Fraxinus spp.* into the UK have also been prohibited, unless they are documented as being from a pest-free area. Hundreds of staff from government agencies have been out checking ash trees across the UK for signs of the disease since early November. This was one of several emergency actions to emerge from a meeting of the Government's emergency committee, COBR, chaired by Environment Secretary Owen Paterson on Friday, November 2. During the first few weeks of November 2012 there was comprehensive publicity and discussion in the UK media about the outbreaks.

In part, this was due to the implications of the disease for the high volume of trade in saplings within the EU single market, and to calls from trade bodies for compensation for losses due to the destruction of saplings.

Publicity was deliberately enhanced by the UK Government's efforts to mobilise the general public in the efforts to control the disease. The approach to the outbreak has demonstrated the value of the planning put in place in the UK as a result of several terrorist attacks and the outbreak of foot-and-mouth disease in 2001. PLANTFOODSEC is developing a network to improve EU bio-preparedness (to prevent, recover and respond) in the case of similar outbreaks.

[www.defra.gov.uk/news/2012/11/09/wms-ash/](http://www.defra.gov.uk/news/2012/11/09/wms-ash/)

## The Invisible War. A novel about bioterrorism by E. Accati and M.P. Simonetti, Lineadaria Editore, Biella (IT), 2012



A novel way to raise awareness.

It is rare to find a thriller based on the theme of agriculture. However, in this innovative book, written in Italian by Professor Elena Accati and Maria Pia Simonetti, agriculture is not merely a framework for the traditional elements of a classic mystery or detective story: the authors have been able to achieve the ambitious goal of engaging readers in such relevant and complex topics as agroterrorism and bioterrorism. An engrossing read,

with great pace, *The Invisible War* gets readers involved in the story. Without giving away any of the plot, a death blow to any thriller, it is safe to say that this is a book for everyone, including the young and those that have no scientific education. It can be seen as a valuable tool for raising awareness of bioterrorism: important information is conveyed in an accessible and exciting way through the medium of this original, well-written thriller.

The book is part of the dissemination activities of the PLANTFOODSEC project and will soon be available in English.

## WP2 IN FOCUS

### Establishing baselines and tackling challenges in food biosecurity



An 2011 outbreak of *E. coli* was attributed to contaminated alfalfa sprouts.

Fresh fruits and vegetables are increasingly associated with outbreaks of foodborne illnesses, and the current volume of trade in these commodities among EU countries increases the risk of accidental or intentional contamination. As a result, outbreak investigations are critical in gaining an understanding of the sources of contamination and the steps required to minimise the impacts. The goals of WP2 are to provide a baseline assessment of forensic capability within the EU to trace the sources of foodborne pathogens, and to identify EU priorities for research and regulatory policy.

In establishing the baselines, the major foodborne pathogens associated with outbreaks involving fruits and vegetables in Europe have been summarised by Audrey Harris, Christine Henry, Emiline Quill and Paul Robb at the Food and Environment Research Agency (FERA), UK, and Hami Alpas, Yesim Soyer, Taylan Kiyimaz, Filiz Yeni, Ozlem Gozde Polat and Elif Gunel at the Middle East Technical University (METU), Turkey. EU laboratories with containment level 2 that can handle major foodborne pathogens and that could be called on in case of emergency or outbreak investigation are being identified by the University of Turin (UNITO), and a review of extraction methods from exemplar food matrices and the analytical methods available for microbe or toxin contamination identification

has been conducted by METU and Rheinische Friedrich-Wilhelms-Universitaet Bonn (UNIBONN) to initiate the first step in standardising the methodology for outbreak investigation. One challenge in food biosecurity is how to prioritise research and regulatory policy for so many different foodborne pathogens and commodities. To tackle the problem, FERA has described a strategy based on the political, economic, social, technological, legal and environmental (PESTLE) factors of a threat scenario in order to facilitate such decision making. PESTLE is a flexible framework that allows for changes in outcomes as situational awareness grows. Another challenge in food biosecurity is how to differentiate between accidental and intentional food contamination.

Jacqueline Fletcher and Li Maria Ma at Oklahoma State University (OSU), US, will create a decision tool for use by law enforcement officials, which allows for discrimination between deliberately caused and accidental incidents. In addition, OSU is working on the development of a strain discrimination technique targeting non-O157 Shiga toxin-producing strains of *E. coli*, which are increasingly being implicated in disease outbreaks, in comparison with *E. coli* O157:H7, in both the US and the EU.

### WP2 Task 2.2 report, METU



Members of the OSU team that worked on the EU project (left to right): Jacqueline Fletcher, Chris Timmons (MS student), Mindy James (Ph.D. student), Ian Moncrief (Ph.D. student) and Maria Ma.

The three-month-long *E. coli* O104:H4 outbreak in Germany in 2011, which affected a total of 3,842 people and resulted in 53 deaths, caused incalculable economic losses and international political friction. The outbreak emphasised the urgent need for rapid, reliable and standardised methods for the detection and extraction of human pathogens on plants (HPOP) and mycotoxins from fresh produce in order to prevent reporting delays in surveillance studies and economic losses. Task 2.2 of Work Package 2 was

designed to achieve this goal. The report by the Middle East Technical University (METU), "Review of Extraction Methods from Exemplar Food Matrices and the Analytical Methods Available for Microbial or Toxin Contamination Identification" (project deliverable D2.25), reviewed the available rapid, reliable, standardised analytical methods for the detection of HPOPs and toxins in fresh produce that can be used in food safety laboratories. Firstly, HPOPs and mycotoxins implicated in outbreaks around the world in recent years were identified. Secondly,

epidemiological studies and trace-back investigations related to these outbreaks were documented. Thirdly, analytical methods used by the United States Department of Agriculture (USDA), the US Food and Drug Administration (FDA), the European Food Safety Authority (EFSA) and others, together with available commercial methods for the detection of HPOPs in fresh produce, were reviewed. Lastly, a review was carried out of literature on methods of extraction from fresh produce and on analytical methods for the determination of HPOPs and mycotoxin contamination.



Hami Alpas (METU) Yesim Soyer (METU)

## PROJECT TRAININGS AND MEETINGS

### Plant and Food Biosecurity Summer School 2012



The 2012 Summer School took place in Turin, Italy.

As part of the PLANTFOODSEC project, five summer schools are planned over five years, with the goal of building up a strong culture of awareness and compliance in relation to plant and food biosecurity for those with responsibilities and interests in all sectors of crop agriculture, including extension specialists, students, crop consultants, regulators, and farm advisors at various levels, and harmonising expertise across the network. The 2012 Summer School was organised in Turin (Italy) by project coordinator Agroinnova, the Centre of Competence for Innovation in the Agro-environmental and Agro-food Sector. The school, which comprised an intensive programme of activities, ran for five days, from

July 16 to 20, and was held at the Regional Museum of Natural Sciences. The 20 participants came from Bulgaria, Colombia, Italy, Morocco, Poland, Serbia and the UK, and a panel of high-level speakers were invited from various international institutions including the Polytechnic and University of Turin, the Istituto Superiore di Sanità (Rome), Ecosystem Onlus and the United Nations Interregional Crime and Justice Research Institute (UNICRI). The aim was to provide a wide overview of biosecurity, addressing various aspects connected to the topic – from international and European law and policies to international trade; from the application of neuromarketing to biosecurity to communicating

science; and from international biosecurity scenarios to emerging risks in Europe. The programme also included two case studies (the EC SESAME project and the *E. coli* outbreak in Germany), an overview of food safety issues, a simulation session on contingency response scenarios, and a visit to the Lagnasco Group, a consortium of four associated cooperatives comprising 387 agricultural producers of fruits, vegetables and aromatic and medicinal herbs mainly from northern Italy, based in the province of Cuneo, not far from Turin. The Summer School ended with a visit to Agroinnova's laboratories and a proficiency assessment.

### Training in METU



Students at the METU training participated in both class and lab sessions in Ankara.

The international event "Training on Foodborne Pathogens: Diagnostics, Safety, Bio-security, Molecular Typing and Food Protection" was held on October 1-2, 2012, in Ankara, Turkey, with the participation of graduate students.

The two-day programme featured both class and lab sessions and was organised in collaboration with lecturers from the Middle East Technical University, Kansas State University (US) and Oklahoma State University (US).

### Consortium meeting in Turkey



Consortium members attended three days of meetings in Turkey.

The 4th PLANTFOODSEC consortium meeting was organised and hosted by the Middle East Technical University on October 5-7, 2012, in Antalya, Turkey, with the participation of project partners, security panel members, and the project external

reviewer appointed by the European Commission. Along with the Technical Committee meetings of the work packages, meetings of the Project Steering Committee and Security Panel were also held during the three-day period.

**WORK PACKAGE NEWSFEED 1/2**



**WP1**

**Plant disease epidemiology applied to crop biosecurity**

The main results achieved by WP1 (tasks 1.1 and 1.2) are the establishment of a comprehensive list of pests, including more than 500 harmful organisms, including insects, fungi, bacteria, viruses and nematodes, likely to reduce crop biosecurity, and a list of target plants and crop products. The latter includes about 450 crops and trees categorised into 11 groups: field crops, vineyards, orchards, vegetable crops, nursery and ornamental horticulture, medicinal and aromatic plants, forest production, beverage crops, straw, tree sap and seeds. Criteria for crop prioritisation were also identified.

These refer to the crop's economic importance, which is based, among other things, on cultivated area, value of production, volume of trade exports, volume and value of trade imports, sociological importance (such as the number of EU countries concerned with the crop, the number of farms concerned with the crop, or territorial density), consumption impact (e.g. its importance in culinary traditions, importance in diet), and environmental impacts (e.g. significant presence in recreational areas, significant presence in threatened and protected areas).

A first classification of the most important crops from an economic point of view (a "top 20" list) was established on the basis of the value of production, and this list will serve as an input to the development of risk analysis under WP3.



**WP2**

**Food biosecurity**

As part of the effort to provide a baseline assessment of forensic capability within the EU to trace the sources of human pathogens on plants (HPOPs) and to identify EU priorities for research and regulatory policy, a comprehensive list of major foodborne pathogens associated with outbreaks involving fruits and vegetables in Europe has been generated, and a review of the extraction and analytical methods available for microbes or toxin contamination identification has been completed. In order to prioritise research and regulatory policy over many different human pathogens and commodities, the "PESTLE" strategy (political, economic, social, technological, legal and environmental) has been explored.

Other ongoing tasks towards accomplishing WP2 objectives include the identification of EU laboratories with containment level 2 that can handle major foodborne human pathogens and that could be called on in case of emergency; the development of a rapid strain discrimination technique targeting non-O157 Shiga toxin-producing *E. coli*, which could be the next leading cause of foodborne illnesses, creating a decision tool that would allow discrimination between a deliberate and an accidental outbreak; the assessment of issues related to the contamination by mycotoxins of grains and other feed crops during storage and production processes; and the identification of gaps and research that could potentially be the subject of a future network project.



**WP3**

**Analysis of risks posed by the intentional introduction of new pests and disease agents**

The WP3 partners have been discussing the representation of risk from bioterrorism and biocrime. We are using a risk paradigm based on the concept of risk arising from a combination of agents, pathways and receptors. In simple terms, the agents are the organisms used; the pathways are the routes by which perpetrators might release organisms, and their motivations; and the receptors are the physical and social environments into which the organisms would be released. The partners see the selection of target agents as mainly based on the ecological properties of the organisms and the plants on which they live. The legal system is focused on pathways of release. The identification of perpetrators, their motives and their actions, forms the limit of the legal framework, while the nature of the agents and receptors is not material to the definition of a crime. The receptors may have varying degrees of responsibility for their level of vulnerability to agents and pathways, which may determine the actions required of them to prevent or respond to attacks, and the wider role of the authorities in determining public plans and reactions. Thus, for example, we may expect certain levels of vigilance among food processing and distribution companies that would reduce their vulnerability to biocrimes, but we may not expect such levels of responsibility among the general public. Each component of the risk paradigm contributes to the development of an overall risk framework within the project, which will lead to demonstrations of quantified risk.



**WP4**

**Diagnostic and detection systems**

A detailed structure for a new virtual diagnostic network to support laboratories across Europe has been developed. Partners at Kansas State University are now reviewing the structure in the light of their own experiences in building similar services. The European network will be targeted at all laboratories, not only those that have statutory plant health responsibilities. While statutory laboratories have specific diagnostic support structures and information databases already in place, advisory organisations are operating independently, and co-ordinated and collated support information is seldom available. The key areas in which the network will develop are:

- Information on laboratories, their expertise and facilities
- Information on diagnostic protocols
- Updates on pathogen outbreaks
- Information on training courses and workshops

The value of the system, and thus its longer-term survival, depend on a two-way flow of information – from and to the user base. Thus laboratories and agronomy companies working in the area of plant protection must be encouraged to join the network by seeing how it can help them. At the same time, the network must satisfy its overarching objective of enhancing crop biosecurity in the EU. In addition, the physical structure of the network will allow for its use by laboratories dealing with human pathogens on plants. Comments from readers are welcome – in particular we would be interested to hear from organisations that might like to "road test" the network as it develops, and provide input on those elements they find most valuable.

**WORK PACKAGE NEWSFEED 2/2**



**WP5**

**Response systems for eradication and containment**

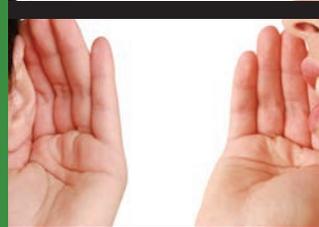
WP5 aims to prevent the deliberate introduction and spread of pathogens by developing new response measures (while enhancing existing ones) to be carried out at a Europe-wide level. A comparison of regulations to be undertaken by EU member states and other participant countries with regard to the containment of accidental or deliberate introduction of non-indigenous harmful organisms has been completed, along with a white paper illustrating possible means of cooperation between countries and agencies in order to mitigate threat situations. Furthermore, the project has identified regulatory deficiencies that might make it difficult for countries to respond to an event in which pathogens are introduced deliberately. The white paper underlines the fact that the process of implementing EU legislation into national laws and practice is not yet complete. Another problem area is the non-listing and inadequate notification of pests: we suspect that many new pests remain unreported by growers, inspectors and national authorities. Also, no EU country is required at present to develop a contingency plan to combat listed pests; thus there are only a few plans that currently are in place. WP5 has delivered a database describing in detail those authorities and institutes charged with responding, under contingency plans, to any crop biosecurity-related issue. The database outlines responsible governmental institutions in each country (i.e. the European continent, USA, Israel and Turkey), and also provides an inventory of EPPO-registered laboratories in each of the aforementioned countries.



**WP6**

**Training on plant and food biosecurity**

The training provided as part of the PLANTFOODSEC network has encompassed tens of courses with hundreds of participants. Among the courses in 2012, the University of Turin hosted the second PLANTFOODSEC Summer School, "Plant and Food Biosecurity". The week focused on biosecurity internationally and looked at case studies, including the *E. coli* outbreak, and how to deal with future incidents. The international event "Training on Foodborne Pathogens: Diagnostics, Safety, Biosecurity, Molecular Typing and Food Protection" was held on October 1-2, 2012, in Ankara, Turkey, with the participation of graduate students. The two-day programme featured both class and lab sessions and was organised in collaboration with lecturers from the Middle East Technical University, Kansas State University (US) and Oklahoma State University (US). Many other courses were held throughout 2012, all aimed at cultivating effective communication and cooperation among plant health professionals, industry, academia and the public sector.



**WP7**

**Dissemination, awareness and communication on plant and food biosecurity**

For the first reporting period, WP7 was able to present a high number of deliverables completed since the beginning of the project. WP7 objectives include the preparation of dissemination materials, publications, articles, posters and technical communications, participation in other dissemination events, the organisation of three workshops, and the creation of the project website. In all these fields, first deliverables have already been made publicly available. For details, please visit the "Publications" section on the project website (<http://www.plantfoodsec.eu/publications.php>).

Under this significant work package, the team is developing various ways to address different stakeholders and target groups on the subject of plant and food pathology. All efforts contribute to achieving the main goal of improving the awareness of stakeholders and the general public on biosecurity issues. However, alongside the traditional dissemination of project deliverables, one task that is becoming increasingly important is the development of a communication plan. This will identify interactions and establish focused relationships with the scientific community in its broader sense, including, in addition to the public, policy makers, governmental bodies and the industrial sector. The creation of new means of communication is considered particularly relevant for the roundtable event in Brussels in February 2013.



**WP8**

**Management and monitoring**

Within WP8, the first project report was submitted to the European Commission, covering the period February 2011 to July 2012. In addition, partner facilities have been inventoried, and an analysis of the division of partner research is ongoing. Efforts are being made to secure future funding, bearing in mind that ensuring network sustainability – even beyond the end of the project period – represents an important task for WP8. Based on an analysis of the outcomes and features of the current project, and taking into account the remarks of the Security Panel and external reviewer, the development of the EU framework for research funding in "Horizon 2020" has been initiated. This focuses on the involvement of stakeholders and end users, with an external funding source search that considers the development of future Network of Excellence activities. Networking activities have taken place both within and outside Europe, at the same time establishing links with other projects and organisations that deal with agriculture, food and biosecurity. In this respect, policy makers, including members of the European Parliament, have been contacted. To date, four project meetings have been held: the fifth project meeting will be hosted by INRA, the French National Institute for Agricultural Research, in Paris, France, on February 8-9, 2013. The sixth project meeting is due to be hosted by the National Institute of Agricultural Botany (NIAB) in Cambridge, UK, on October 4-5, 2013.

**THE PROJECT** // Five years, EU funding of EUR 6 million, 13 partners, eight work packages and three continents: these are the numbers that sum up the project “Plant and Food Biosecurity, Network of Excellence” (PLANTFOODSEC), launched in February 2011. The aim is to build a virtual centre of competence in order to increase the quality and impact of plant and food biosecurity training and research in Europe, thus enhancing preparedness and response capabilities to prevent, respond to and recover from biological incidents or deliberate criminal activity threatening the European agri-food system.



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