Vitenskapskomiteen for mattrygghet
Norwegian Scientific Committee for Food Safety

Uttalelse fra Faggruppe for plantehelse, plantevernmidler og rester av plantevernmidler (Faggruppe 2) i Vitenskapskomiteen for mattrygghet

9. februar 2007

Risikovurdering av pærebrann i Norge

BAKGRUNN

Plantesykdommen pærebrann forårsakes av bakterien *Erwinia amylovora* (Burrill) Winslow *et al.* Bakterien har et vidt spekter av vertplanter i rosefamilien. En nylig utgitt liste inneholder 180 mottakelige arter i 39 slekter. Blant vertplantene finnes arter innen fruktslektene *Pyrus* og *Malus*, og prydbusker i slektene *Chaenomeles*, *Cotoneaster*, *Crataegus*, *Pyrachanta* og *Sorbus*. Spredningsveier for pærebrann er vurdert på to nivåer; innføring fra andre land (langdistansespredning) og innføring fra andre deler av Norge der pærebrann allerede finnes (kortdistansespredning). Langdistansespredning av pærebrann skjer med infisert vertplantemateriale, mens pollinerende insekter, forurensede bikuber og beskjæringsredskaper er de viktigste årsaker til lokal spredning. Det er vanskelig å holde sykdommen under kontroll. Fytosanitære tiltak, spesielt gjennom lovgivning, er viktig for å hindre introduksjon og spredning av sykdommen.

I Norge foregår det kommersiell dyrking av epler på 16 000 daa i 1000 frukthager, og pærer dyrkes på 1320 daa i 353 frukthager. I 2005 hadde epler en førstehåndsverdi på 78 mill kr og pærer en førstehåndsverdi på 5,5 mill kr. Prydbusker, mottaklige for pærebrann blir mye dyrket, og noen arter har spredt seg fra parker og hager i kystsdistriktene.

I 1986 ble pærebrannbakterien først påvist i Stavanger og nabokommuner i Rogaland fylke. Siden det har utbredelsen i Norge økt. *Cotoneaster bullatus* (bulkemispel) og *C. salicifolius* (pilemispel) som finnes i private hager, parker, langs veier og i kystområder er de artene som er mest utsatt for infeksjon. Fire fylker har hatt tilfeller av pærebrann: Sogn og Fjordane, Hordaland, Rogaland og Vest-Agder. Sykdommen er så langt ikke påvist i planteskoler eller yrkesfruktdyrking i Norge til tross for omfattende kartlegging i henhold til ISPM 6 (1997).

OPPDRAG FRA MATTILSYNET

Vitenskapskomiteen for mattrygget (VKM) fikk 22. juni 2006 i oppdrag fra Mattilsynet å gjøre en risikovurdering av pærebrann. Risikovurderingen skal være i henhold til ISPM 11 (2004). ”Risikovurdering av karanteneskadegjørere, inkludert vurdering av miljørisiko og levende, modifiserte organismer”. For å komme frem til mest mulig riktige bekjempelsestiltak og nivåer på disse, anmodet Mattilsynet VKM spesielt å vurdere hvilke produksjonsmessige

og økonomiske konsekvenser en eventuell spredning til viktige fruktdistrikter, i Hardanger, Sogn og Fjordane og Telemark, vil kunne få for fruktprodusentene. Det er også behov for å få belyst hvilke konsekvenser en slik spredning vil få for planteskoler, hageeiere, samt eventuelle miljømessige konsekvenser.

SAKSGANG

Faggruppen for plantehelse, plantevernmidler og rester av plantevernmidler (Faggruppe 2) i VKM bestilte en utredning om pærebrann fra Bioforsk Plantehelse. Rapporten ble mottatt 15. desember 2006 og er bakgrunn for de konklusjoner faggruppen gir i sin risikovurdering. Faggruppens konklusjoner ble vedtatt på et møte 18. januar 2007.

OPPSUMMERING AV BIOFORSKS RAPPORT

Faggruppen viser til Bioforsks rapport "Fire blight in Norway - An assessment of the plant health risk of the plant disease fire blight in Norway" (Sletten og Rafoss 2006, se vedlegg). Faggruppen gir her en kort oppsummering av rapporten:

Karakterisering av skadegjøreren

Bakterien *E. amylovora* tilhører ordenen Enterobacterials. Standard metoder for identifisering er beskrevet av European Plant Protection Organization (EPPO) Standard 7/20 (EPPO2004).

Patogenet gir symptomer på alle overjordiske plantedeler. Rask visning og død av blomster, unge sukkulente skudd og kvister, brunfarging og død av blader, bøying av skuddspisser, mumifiserte, mørke frukter og sår på infiserte kvister, grener og stamme er noen av de mest karakteristiske symptomene. Mer informasjon om skadegjøreren er presentert i Bioforsks rapport (se vedlegg).

Status som planteskadegjører

I Norge anses pærebrann som en karanteneskadegjører og er oppført i vedlegg 2 i Forskrift om planter og tiltak mot planteskadegjørere (Plantehelseforskriften) 2000-12-01 nr 1333. Patogenet er oppført på EPPOs A2 liste.

Biologisk karakterisering

Patogenet krever fuktighet for infeksjon, og infiserer gjennom naturlige åpninger og sår. Bakterien overvintrer i barken på kvister og greiner. Optimal infeksjonstemperatur ligger mellom 18-30 ^{o}C, men infeksjon kan også foregå ved lavere temperaturer.

Bakterien spres via regnsprut eller insekter til mottaklige blomster og unge skudd. Langdistansespredning skjer via infiserte planter eller plantemateriale. Bakterien overlever fra år til år i levende vertplanter. Som epifytt kan bakterien kun overleve noen få dager, men i bikuber kan den overleve flere uker. Flere detaljer om biologien og epidemiologien til sykdommen er beskrevet i Bioforsks rapport.

Sannsynlighet for introduksjon og spredning

Rapporten fra Bioforsk vurderer infisert plantemateriale som hovedsmitteveien for innførsel fra andre land (langdistansespredning) til distrikter som tidligere var fri for pærebrann. Sannsynligheten for at patogenet kommer denne smitteveien vurderes som høy. Det er imidlertid ikke lov å importere planter eller formeringsmateriale (utenom frø) som er verter for *E. amylovora* til Norge. Kommersiell og privat fruktimport medfører minimal sannsynlighet for introduksjon av patogenet, mens sannsynligheten for spredning ved flytting av utstyr og maskiner vurderes som moderat.

Sannsynligheten for spredning av patogenet fra infiserte områder i Norge (kortdistansespredning) anses som høy ved flytting av plantemateriale, bikuber, utstyr og maskiner. Sannsynligheten for spredning med insekter er moderat.

Sannsynlighet for etablering

E. amylovora er etablert i ytre kystdistrikter på Vestlandet og Sør-Vestlandet. Det betyr at klimaforholdene er gunstige for utvikling, overlevelse og spredning av pærebrann i disse områdene. Pærebrann har ennå ikke nådd fruktdistriktene i de indre distriktene på Vestlandet, eller områdene i Øst-Norge.

Fenologiske studier i 2006 gav data for blomstring i noen av de viktigste fruktdistriktene i Norge. Bioforsk har sammenlignet disse resultatene med meteorologiske data for de siste ti årene, og konkluderer med at i de fleste år vil lav temperatur hindre blomsterinfeksjon av pærebrann på frukttrær. Hovedblomstringen for epler foregår ved lave temperaturer om våren. Kun fra midten av juni og fremover er klimaet gunstig for infeksjoner. Bioforsk har samlet fenologiske og meteorologiske data fra to lokaliteter, Njøs i Sogn og Ullensvang i Hardanger. For sorten ”Aroma” har det vært perioder med potensiell blomstringsinfeksjon i to av ti år på Njøs og i ett av ti år på Ullensvang. Sorten ”Summerred” hadde ingen slik periode. Sekundær blomstring i varmere perioder om sommeren er uvanlig hos hovedsortene. Omfattende etablering av pærebrann i *C. bullatus* og *C. salicifolius* i sørvestlige kystdistrikter i Norge kan mest sannsynlig forklares ved lange blomstringsperioder i disse artene.

Vurdering av potensielle økonomiske konsekvenser

De økonomiske konsekvensene av pærebrann er vanskelig å fastslå, siden lave avlingstap ikke registreres. I et hypotetisk ”worst-case” scenario, der de økonomiske konsekvensene ved et utbrudd tilsvarer et avlingstap på 50 % for pærer og 20 % for epler, beregner Bioforsk et årlig tap på 15,6 mill kr for epler og 2,5 mill kr for pærer. Rapporten fra Bioforsk indikerer at blomsterinfeksjon i epler vil oppstå i ett av ni år på Ullensvang og to av ti år på Njøs. Med kraftige infeksjoner hvert femte år vil gjennomsnittlig årlig avlingstap av epler være på 3,1 mill NOK.

Eksempelet over (50 % og 20 % avlingstap) er mest sannsynlig et altfor pessimistisk scenario under norske forhold. Det er allikevel interessant at de akkumulerte kostnadene gjennom de nitten første årene med bekjempelse av pærebrann i Norge (ca. 18 mill kr i 1986-2004) tilsvarer de kostnadene et massivt utbrudd av pærebrann i fruktdistriktene vil kunne gi på ett år. Hvis flere direkte og indirekte konsekvenser av skadegjøreren inkluderes i dette scenarioet vil de potensielle kostnadene øke betydelig.

Førstehåndsverdien av innenlandsk planteskoleproduksjon er mer enn tre ganger den av yrkesfruktdyrkingen. I 2004 ble det solgt planter, mottaklige for pærebrann, for 58 mill kr.

Siden vertplantene i slekten *Cotoneaster* blomstrer gjennom hele sommeren, er årlige infeksjoner sannsynlig. Pærebrann i norske planteskoler vil redusere produksjonen betydelig, og tapene vil kunne overstige tapene fra fruktproduksjonen.

KONKLUSJON

Faggruppe 2 viser til Bioforsks rapport (Sletten og Rafoss 2006, se vedlegg) og gir følgende risikovurdering av pærebrann:

- Med dagens fytosanitære regelverk og praksis for bekjempelse av pærebrann i Norge anslås sannsynligheten for introduksjon av pærebrann til fruktdistrikter og planteskoler til å være lav. En lemping på nåværende regelverk og praksis vil medføre moderat risiko for introduksjon.
- Import av frukttrær og formeringsmateriale fra land der pærebrann er etablert vil ikke øke risikoen for introduksjon av pærebrann gitt at nåværende regelverk og "post-entry" karantene gjennomføres.
- Med dagens fytosanitære regelverk og praksis i Norge vil videre spredning av pærebrann medføre minimal risiko for private hager. En lemping på nåværende regelverk og praksis vil skape moderat risiko for private hager.
- Med dagens fytosanitære regelverk og praksis i Norge er det minimal risiko for negative miljøkonsekvenser av sykdommen. En lemping på nåværende regelverk og praksis vil gi lav risiko for negative miljøkonsekvenser.
- Med dagens fytosanitære regelverk og praksis i Norge er det minimal risiko for økonomisk tap i yrkesfruktdyrking og planteskoler. En lemping på nåværende regelverk og praksis vil resultere i moderat risiko for økonomiske tap.
- Det vil bli store økonomiske konsekvensene av et "worst-case" scenario, med en omfattende pærebrannepidemi i norske frukthager og planteskoler.

Risikovurderingen er basert på omfattende litteratur om pærebrann og 20 års erfaring fra kartlegging av sykdommen i Norge. Usikkerheten ved disse konklusjonene er dermed lav. Usikkerhetene i risikovurderingen er beskrevet i tabell 1.

VURDERT AV

Faggruppe for plantehelse, plantevernmidler og rester av plantevernmidler (Faggruppe 2):

Erik Dybing (leder), Hans Ragnar Gislerød, Trond Hofsvang, Leif Sundheim og Anne Marte Tronsmo

Koordinator fra sekretariatet: Elin Thingnæs, assistert av Malin Lemberget Lund

TAKK TIL

Faggruppe 2 takker Dr. Trond Rafoss og Dr. Arild Sletten ved Bioforsk Plantehelse for deres viktige bidrag til arbeidet i form av rapporten "Fire blight in Norway - An assessment of the plant health risk for the plant disease fire blight in Norway" og nyttige diskusjoner gjennom prosessen.

Tabell 1. Usikkerheter og mulig videre arbeid som kan forbedre risikovurderingen.

Risikovurdering	**Usikkerheter**	**Mulig videre arbeid som kan forbedre risikovurderingen**
Taksonomi	Ingen	Ingen
Spredningsvei	Ingen	Ingen
Utbredelse	Lav. Nasjonal kartlegging gjennom de siste 20 år. Tilfeller i andre EPPO land er kjent.	Videre kartlegging.
Vertplanter	Ingen	Ingen
Etablering	Lav. Etablering i deler av PRA området.	Videre undersøkelser
Spredning	Lav. Spredning i PRA området.	Videre undersøkelser
Konsekvenser	Moderat. Konsekvensene er usikre siden det ikke er registrert utbrudd i yrkesfruktdyrking eller i planteskoler. Hvilken innflytelse klimaendringer vil ha er usikkert.	Videre fenologiske studier i fruktdistriktene. Undersøkelser av mottaklige planter i planteskoler.

REFERANSER

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Sletten A. og Rafoss T. 2006. Fire blight in Norway - An assessment of the plant health risk for the plant disease fire blight in Norway. Bioforsk Rapport Vol. 2 No. 13 2007. Commissioned by the Norwegian Scientific Committee for Food Safety (VKM). Se vedlegg.

Vedlegg

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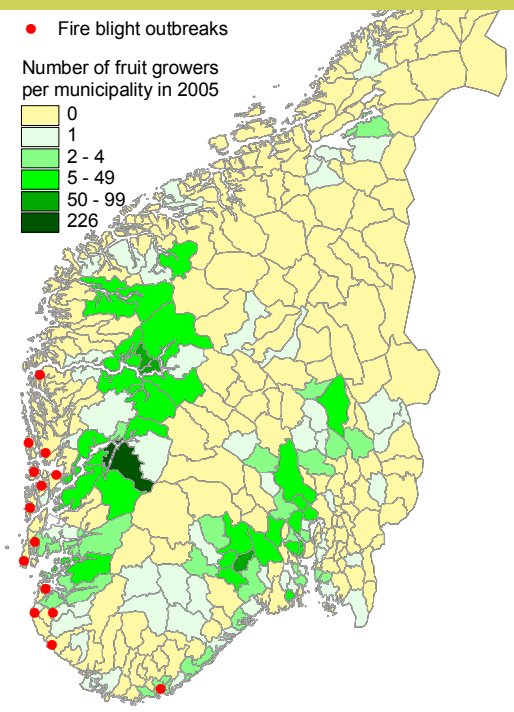
Vol. 2 No. 13 2007

Fire blight in Norway

An assessment of the plant health risk for the plant disease fire blight in Norway

Arild Sletten and Trond Rafoss
Bioforsk Plant Health and Plant Protection



Main office
Frederik A. Dahls vei 20,
N-1432 Ås
Tel.: 64 94 70 00
Fax: 64 94 70 10
post@bioforsk.no

Bioforsk senter
Enhet
Adresse
Tel.:
Fax:
@bioforsk.no

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Summary:

This report assesses the plant health risk for the bacterial plant disease fire blight for the Pest Risk Assessment area of Norway. In addition to providing an updated pest categorisation for fire blight in relation to Norway, the report provide new results on fruit tree blossom infection risk based on examination of historical climate and phenology data. The report conclude that if *E. amylovora* is introduced into the main fruit growing districts of Norway, it is expected that the damage and losses to commercial fruit production and nurseries will be minor, under the current phytosanitary regime in Norway. Relaxation of the regulations in force for fighting fire blight in Norway will increase the expected damage and losses to commercial fruit production and nurseries to a moderate level.

Sammendrag:

Plantehelserisiko for den bakterielle plantesjukdommen pærebrann er vurdert for Norge gjennom en oppdatert oversikt og status for pærebrann generelt og i en norsk sammenheng. Nye resultater for blomsterinfeksjonsrisiko basert på analyse av klima og fenologi data legges her frem. Det konkluderes at dersom *E. amylovora* introduseres til fruktdyrkingsdistriktene i Norge, forventes det skader og tap for kommersiell fruktproduksjon og planteskoler av mindre størrelse, under det gjeldende plantehelseregimet i Norge. Dersom det lempes på gjeldene reguleringer for bekjempelse av pærebrann i Norge vil forventet skade og tap for kommersiell fruktproduksjon og planteskoler av introduksjon av pærebrann til fruktdistriktene øke til et moderat nivå.

Land/county:	Norway
Municipality:	Ås
Place:	Ås

Responsible leader

Project leader

Name Responsible leader

Name Project leader

Contents

1. Stage 1: Initiation

1.1 Initiation points

1.1.1 PRA initiated by the review or revision of a policy

This Pest Risk Assessment (PRA) is initiated by the review or revision of a policy. For details about the basis for this revision, it is referred to the Norwegian Scientific Committee for Food Safety.

1.2 Identification of PRA area

The PRA area is Norway.

1.3 Information

Information sources utilised for this PRA are all published material available in international scientific journals, books, reports, personal communications, geographic data that has been made available to the risk assessors. Where these information sources have been used, this is indicated in the text by references enclosed in brackets.

1.3.1 Previous PRA

No previous PRA exist for the pest *Erwinia amylovora* for the PRA area. The import risk analysis for apples from New Zealand for the PRA area of Australia (Biosecurity Australia 2006) includes a PRA for *E. amylovora* limited to the pathway of apples from New Zealand. Other PRA's for *E. amylovora* is not known.

1.4 Conclusion of initiation

The initiation point for this PRA is the review of the policy of *E. amylovora* for the PRA area of Norway.

2. Stage 2: Pest Risk Assessment

2.1 Pest categorization

2.1.1 Identity of pest, name and taxonomic position

2.1.1.1 Name

Erwinia amylovora (Burrill) Winslow *et.al.*

2.1.1.2 Synonyms

Micrococcus amylovorus Burrill

Bacillus amylovorus (Burrill) Trevisan

Bacterium amylovorus (Burrill) Chester

Erwinia amylovora (Burrill) Winslow et.al. f.sp. rubi Starr, Cardona & Falson

2.1.1.3 Common names of the disease

Fire blight (English)

Feu bactérien (French)

Feuerbrand (German)

Pærebrann (Norwegian

Päronpest (Swedish)

Ildsot (Danish)

2.1.1.4 Taxonomic position

Bacteria, Gracilicutes, Protobacteria, γ Subdivision, *Enterobacteriales, Enterobacteriacea*

2.1.1.5 Bayer computer code

ERWIAM

2.1.2 Methods for detection and identification

Fire blight can be diagnosed on the basis of symptoms on host plants, isolation of the pathogen, and subsequent identification of the isolate as *Erwinia amylovora* with the methods described in EPPO Standard PM 7/20 (EPPO 2004).

2.1.2.1 Symptoms

Fire blight attacks all above-ground parts of the host plant. The most characteristic and common symptoms are rapid wilting and death of flowers, young succulent shoots and twigs. The dead blossoms become dry and dark-brown to black in colour, and remain attached to the plant. The tip of young shoots bends and forms the symptom known as "sheperds crook". Leaves usually turn brown or black from the petiole. Dead leaves also remain attached for a long time. Fruits may be infected. They turn brown to black and become mummified. On larger twigs, branches and the trunk fire blight may cause cankers, recognized as slightly sunken and irregular cracked areas on the bark. Internally the tissues of the cankered area show a foxy red or brown discolouration which diffuses into the healthy tissues. In warm, wet conditions, a whitish mucoid, sticky bacterial ooze may exude in droplets from infected shoots, cankers, fruits and blossoms. Symptoms of fire blight on the most common host plants are relatively similar. The symptoms associated with rootstock infections are different from the 'classic' symptoms of fire blight. In spring, rootstock infections are revealed by a delayed bud break, followed by poor growth or even the death of the tree. The sudden death of a tree in mid-season can also be due to rootstock infection. Most often, however, it is during autumn that symptoms are the most dramatic. Leaves get an early red colour and cling to the tree. Losses due to rootstock infection can be severe (EPPO/CABI 1997, EPPO 2004, Vanneste & Eden-Green 2001).

2.1.2.2 Identification

From symptomatic tissues (Figure 1) *E. amylovora* can relatively easily be isolated on nutrient agar. From asymptomatic tissue, a method for enrichment of the bacterium is recommended. Plant material can also be screened directly by serological or molecular methods. If the test is positive, an attempt should be made to isolate the pathogen from the screening extract. Pure cultures of presumptive *E. amylovora* should be identified using at least two tests related to two different characteristics of the pathogen (nutritional, fatty acids, serological or molecular). An appropriate host test should be included as final confirmation of pathogenicity (EPPO 2004).

Figure 1. Young pear tree in an orchard in New Zealand showing fire blight symptoms (upper left photo by A. Sletten). Fire blight on *Cotoneaster salicifolius* in Norway (upper right photo by E. Fløistad). Fire blight on *Cotoneaster bullatus* in Norway (lower photo by A. Sletten)

2.1.3 Presence or absence in PRA area

Fire blight was detected in Norway for the first time in 1986. The focus of infection was in and around the city of Stavanger in Rogaland county on the South West coast of the country. Mainly *Cotoneaster bullatus* and *C. salicifolius* were attacked. There is no commercial fruit-growing in this area, but many large nurseries. The disease was contained and finally eradicated from the area in 1992 (Sletten 1992). However, in 2000 fire blight re-emerged, in the same county, on the island Karmøy, separated from the first outbreak by 25 km open sea. A new containment and eradication programme was started. Nevertheless, the disease continued to spread to the north, mainly due to the movement of beehives contaminated with *E. amylovora*, from areas with diseased plants to areas free from fire blight with warm and humid weather conditions, favourable for the development of the disease (Sletten & Melboe 2004). Fire blight has been detected in private gardens, around public buildings, in recreation grounds, along roads, and in rural areas in the coastal areas of the counties of Rogaland, Hordaland and Sogn og Fjordane. It has not been detected in nurseries, in fruit-growing areas, or in other parts of the country. This is based on an extensive surveillance program according to ISPM 6 (ISPM 1997), which have been carried out for many years in Southern Norway. The main hosts are still *C. bullatus* and *C. salicifolius* and some other *Cotoneaster* spp. Occasionally diseased *Sorbus aria, Pyrachanta* and apple and pear have been detected (Sletten & Melboe 2006). Recently, a very limited outbreak on *C. bullatus* and *C. salicifolius* was detected in the city of Kristiansand in Vest-Agder county (Norwegian Food Safety Authority 2006b).

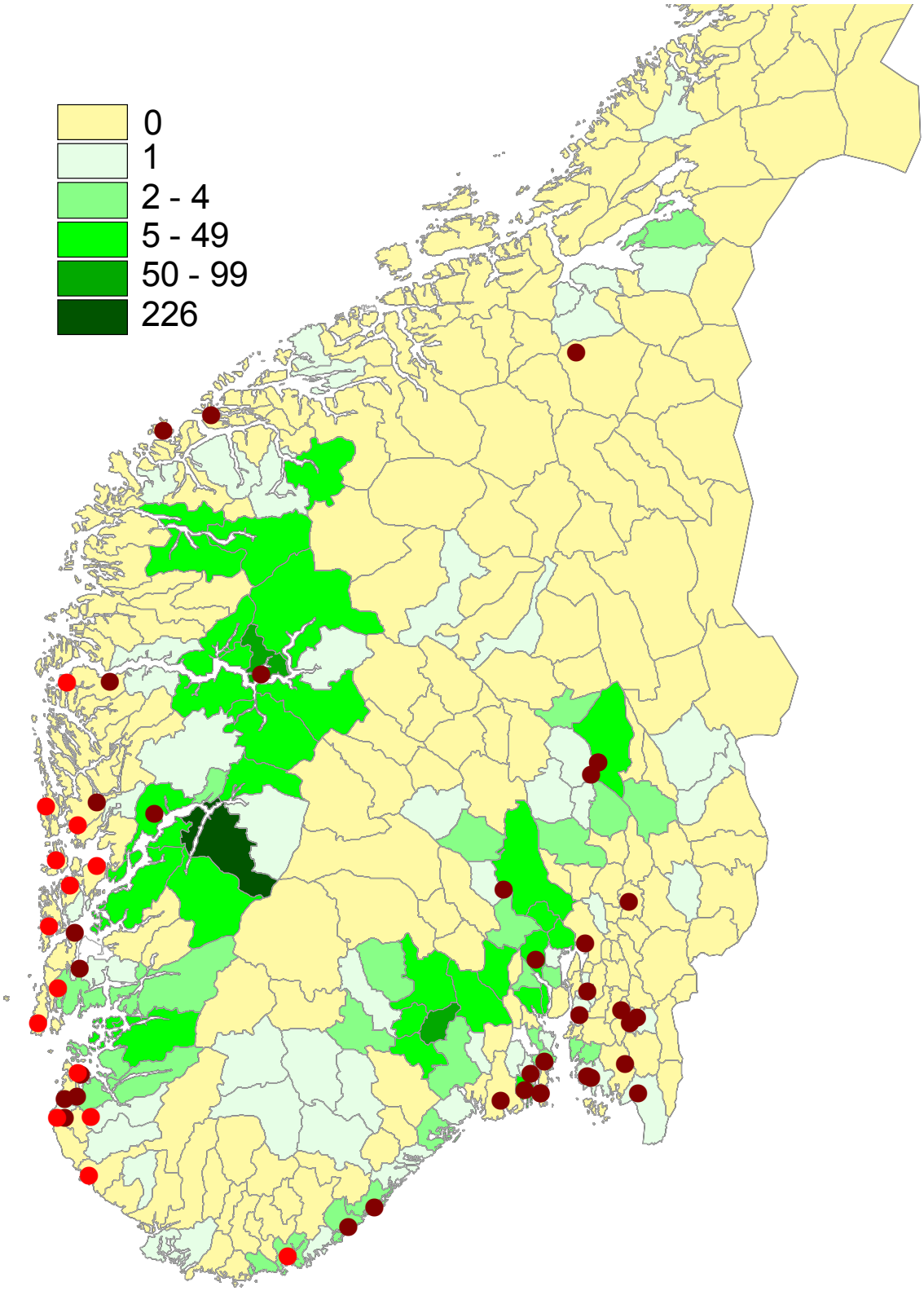


Figure 2. Outbreaks of fire blight in Norway (red filled circles), nurseries producing host plants to fire blight (brown filled circles) and number of fruit growers per municipality (coloured polygons).

2.1.4 Regulatory status

Norway: *E. amylovora* is a quarantine pest to Norway.

EPPO: A2 list no. 52

EU: Annex designation II/A2

Norway: Act of 19 December 2003 No. 124 relating to Food production and food safety, and FOR of 2000-12-01 No. 1333: Regulations relating to plants and measures against pests, Annex 2 (Royal Ministry of Agriculture 2000, Norwegian Food Safety Authority 2006a) which is attached to this document as Attachment 2.

2.1.5 Biological characteristics of the pest

2.1.5.1 Interaction host/pest

Erwinia amylovora infects the host through natural openings such as stomata, hydathodes, leaf traces and nectarthodes, and through wounds or tissue damaged by strong winds or hail. Moisture, in the form of free water on host surfaces, is necessary for infection. A high level of soil moisture, provided by rain or irrigation which leads to a high plant/tissue water potential, will strongly support disease development. The most favourable temperature for rapid disease development lies between 18° and 30° C. However, both the host plant and the pathogen can grow at lower temperatures, but they do so at an increasingly slower rate (Billing 1992). *E. amylovora* spreads from the point of infection through the intercellular space of the cortical parenchyma, killing rapidly spurs and branches, in warm weather advancing often up to 25-50 mm/day. Sometimes *E. amylovora* gets sucked into the xylem vessels, where it can multiply and migrate rapidly and considerably beyond the point of initial entry. Symptoms are not usually observed whilst bacteria are confined to the xylem. Under conditions that as yet are incompletely understood, *E. amylovora* may escape from the xylem vessels and invade the cortical parenchyma inducing typical fire blight symptoms, or atypical symptoms when only the rootstock gets infected. During warm and humid weather droplets of a bacterial slime may ooze from affected plant parts. Ooze may also emerge following frost (Billing, personal communication). Highly susceptible host plants may die within one or a few seasons (Lelliott 1988, Paulin 1997, Vanneste & Eden-Green 2000).

2.1.5.2 Disease cycle

E. amylovora may survive in cankers on spurs, twigs and branches. In the spring such cankers become active and produce inoculum on the surface, often in the form of visible bacterial slime (ooze). Inoculum may be spread by rain splash or insects to susceptible blossoms or young shoots where, if conditions are favourable, infections will be established and further inoculum in the form of ooze will be produced at a later date. In warm weather, spread of infection between blossoms by pollinating insects can be very rapid. Fire blight may continue to develop in a cyclic fashion through the growing season and spread from cankers to flowers, to tips of post-bloom extension shoots and to secondary blossoms. During bloom, flowers infected at an early stage may produce inoculum when later flowers are still opening, and a second or even third cycle may be initiated before the end of bloom. Similarly in the post-bloom period, several cycles of disease may occur in young shoots or secondary blossoms before the end of the growing season. Simultaneously, disease may progress from cankers down or up the tree. Current-season infections may become sealed off by a cork-layer from healthy tissue at an early stage, but in other cases the disease will continue to progress in stems with periodic release of ooze providing additional inoculum for later infections. Some of these cankers will remain unsealed at the end of the growing season and, if the pathogen survives over winter, they will become potent sources of inoculum the following spring (Billing 1992, Lelliott 1988).

2.1.5.3 Dissemination

Over long distances fire blight is mainly transmitted by host plants, or parts thereof such as budwood, which are latently infected or have undetected small cankers. Locally *E. amylovoa* is spread by insects, rain and wind. The physical properties of the bacterial ooze which emerges from diseased tissue are greatly influenced by moisture. Under dry conditions it shrinks and hardens; under moist conditions it swells and is easily dispersed by rain; at intermediate humidity it is sticky and may adhere to insects or disperse by wind in the form of fine strands. Bacteria may adhere to pollen and thus be spread by wind or insects to susceptible plants. Pollinating insects are recognized as the most efficient carriers of *E. amylovora* from infected to non-infected blossoms. It has been shown that foraging honey bees (*Apis mellifera*) may visit as much as 400 blossoms per hour, and that the estimated efficiency of bees to disperse *E. amylovora* from infected hives to pome fruit blossoms could average 20 blossoms per hour of foraging activity (Johnson *et al*. 1993). Beehives contaminated with *E. amylovora* may, if they are moved, introduce fire blight into areas previously free from fire blight. Pruning tools which have become contaminated may cause devastating spread of the disease. There have been some speculations that after roosting on infected branches, birds can carry infection to previously unaffected areas; however there is no conclusive evidence that spread may occur in this way (Billing 1992, Lelliott 1988, EPPO/CABI 1997).

2.1.5.4 Survival

E. amylovora may survive from one year to the next in dormant host plants. It does so mainly in living bark tissues along the margins of overwintering cankers on hosts that have been infected in the previous growing season (Eden-Green & Billing 1974, Beer & Norelli 1977), but also as latent infections in shoots and buds, which may initiate cankers to serve as primary inoculum in the spring (Bonn 1981, van der Zwet & Buskirk 1984, Mazzuchi *et al*. 2006). If present in xylem vessels the bacterium may survive for at least one season (Vanneste & Eden-Green 2001). *E. amylovora* may survive in beehives for several weeks, but there is no conclusive evidence in the literature that it can overwinter in hives (Thomson 2000). Survival in soil is short-term. *E. amylovora* could not be detected 5 weeks after field soil had been inoculated with the bacterium. In sterile soil the number of living bacteria was stable for 11 weeks (Hildebrand *et al*. 2001). The ability to grow and survive as an epiphyte on the surface of leaves is poor, usually lasting only for a few hours or days depending on the weather conditions (Paulin 1997, Thomson 2001, Ockey & Thomson 2006, Norelli & Brandl 2006). *E. amylovora* have been reported to survive in infested apple calyces for up to 20 days after inoculation. The incidence of naturally infected apples is usually very low, and the potential for spread via fruit is considered to be extremely low (Taylor *et al*. 2002).

2.1.5.5 Control

The control of fire blight is difficult. In spite of the fact that fire blight has been known for more than 200 years, there is still no completely satisfactory and reliable control measure. An integrated control programme with several approaches is recommended. Preventive measures include restrictions on the importation of susceptible hosts from countries or areas where the disease occurs, and eradication and containment campaigns to stop or limit spread soon after the introduction of the pathogen. Other approaches are orchard management of susceptible hosts to minimise the effects of infection, including encouragement of the use of cultivars that are resistant or have low susceptibility, and to ban planting of the most susceptible ornamental hosts in fruit growing areas(EPPO/CABI 1997, Sobiczewski *et al*. 1997, Norelli *et al*. 2003).

The application of bactericides to eliminate *E. amylovora* and render plant surfaces unsuitable for the establishment of new infections is another approach, but like all plant bacterial diseases, fire blight is difficult to control with chemicals. No satisfactory and reliable spray programme for fire blight that can be recommended for field application has been developed. The main reason for this is most likely the complicated life cycle of the disease, and the lack of curative or systemic bactericides which have satisfactory effect, are environmentally safe, non-phytotoxic and commercially available. Bactericides

need to be applied before the inoculum reaches the receptive plant sites, and need to remain active as long as the inoculum is present. Once *E. amylovora* has entered the host tissue it is inaccessible to externally applied sprays. The necessary number of sprays depends on the weather conditions and the length of period favourable for initiation of infection, thus it is necessary to have an accurate and reliable prediction system in order to time sprays effectively (Garrett 1990, Psallidas & Tsiantos 2000).

A large number of different chemicals have during the years been tested against fire blight, but only copper compounds are considered to have acceptable effect. They have been used against fire blight on apples and pears since 1900 (van der Zwet & Keil 1979), mostly in the form of copper sulphate plus lime (Bordeaux mixture), but also copper hydroxide and copper oxychloride are useful. Antibiotics are very efficient antibacterial agents, and among them streptomycin is the one used most frequently in fire blight control (Paulin 1997). However, there are many problems connected with the use of copper and antibiotics. They are phytotoxic, especially on blossom and fruit, and there is a risk of resistance to these compounds to develop. Streptomycin was introduced in USA already around 1950, and became widely used, often exceeding ten sprays per season, causing the development of streptomycin-resistant strains of *E. amylovora*. Presently, streptomycin preparations are only used once or a couple of times during the season, mainly at blossom and intensive shoot growth. In many countries the use of antibiotics in plant protection is not allowed because there is a risk that resistance to them could be developed, and spread in the environment and subsequently among bacteria causing disease in humans and animals (Sobiczewski *et al*. 1997).

Control of fire blight with biological agents has had some success. Antagonistic bacteria, mainly *Erwininia herbicola, Pseudomonas fluorescens* and *P. syringae,* which inhibit growth of *E. amylovora* in flowers, have been used in several countries. The use of different natural plant extracts which inhibit bacterial growth, and compounds which interact with the plant natural defence mechanisms are also reported to have effect (Psallidas & Tsiantos 2000, Sobiczewski *et al*. 1997). In most cases biocontrol of fire blight should be viewed as a complementary disease control strategy, where the benefits from its use will be most significant when integrated with orchard sanitation and the application of chemicals during periods of high infection risk (Johnson & Stockwell 2000).

Pruning plant parts infected by fire blight has for many years been considered a valuable control measure, but the effect is often questioned. During the dormant season it is important to inspect plantations of host plants carefully and to remove overwintering cankers caused by *E. amylovora*. During the growing season however, pruning of infected plant parts may easily involve a great risk of contamination unless pruning tools are adequately disinfected. Pruning wounds are likely to serve as entry points for *E. amylovora*, and consequently summer pruning should only be performed during dry weather conditions (Sobiczewski *et al*. 1997).

The variation in susceptibility to fire blight between cultivars of the same host species is the basis for control of the disease through the choice of cultivars and breeding for resistance. A specific problem concerning fire blight is that fruit trees are expected to be productive for a long period. The choice of a susceptible cultivar may appear to be appropriate at the time of planting because the disease is not present in the area, but may appear wrong a few years later when the disease is introduced. Breeding-programmes for resistant cultivars of apple and pear, rootstocks and to some extent ornamentals have been going on for many years, particularly in North America. Many cultivars and rootstocks with a good level of resistance to fire blight have been produced. Unfortunately, these cultivars are often not among those preferred by growers. In the literature there are few reports of the degree of susceptibility of the apple and pear cultivars commonly grown in Norway. The ratings of resistance given is also often conflicting and difficult to compare, mainly due to which part of the plant that has been inoculated, and the many different methods in use for inoculating fire blight. The extent of

damage caused by fire blight is strongly affected by plant age, vigour and nutrition, environmental factors, particularly temperature and humidity, soil types and moisture content, cultural practices, and a combination of one or all of these factors with the time of bloom. In recent years attempts have been made to genetically transform pear and apple genotypes by introducing known high-quality cultivars genes for antimicrobial proteins with low toxicity to eukaryotic cells, or genes promoting plant defence responses, thus enhancing fire blight resistance. So far, these transgenic cultivars are only experimental (Lespinasse & Aldwinckle 2000, Norelli *et al*. 2003, Paulin 1997, Sobiczewski *et al*. 1997, van der Zwet & Kiel 1979).

2.1.6 Potential for establishment and spread in PRA area

2.1.6.1 Host plants of fire blight

E. amylovora is a pathogen of *Rosaceae* and has a wide host range within that family. Van der Zwet & Keil (1979) and Bradbury (1986) list more than 180 species in 39 genera of the family *Rosaceae* as susceptible to fire blight, but some of these hosts are reported to be susceptible only by artificial inoculation and may be dubious. Within each host species there are genotypes which may have very high, intermediate or very low susceptibility to *E. amylovora*. The most economically important and susceptible hosts are in the sub-family *Maloideae,* in particular the fruit crops *Pyrus* spp., *Malus* spp., *Eriobotrya japonica,* and *Cydonia* spp., Many ornamental plants in *Chaenomeles* spp., *Cotoneaster* spp., *Crataegus* spp., *Mespilus* spp., *Photinia* spp., *Pyrachanta* spp. and *Sorbus* spp. are also highly susceptible (EPPO/CABI 1997). Natural infections have been reported in other sub-families. Of these, *Rubus* spp. in *Rosoideae* is most important. *E. amylovora* isolated from these hosts are the only known host-specific strains of the species because they do not infect apple or pear, and thus has been named f.sp. *rubi*. (EPPO/CABI 1997, Vanneste 2000). The host plants of fire blight relevant to Norway and the current regulations to these plants are listed in the "Norwegian Regulations relating to plants and measures against pests" Annex 3 point 6.1 (Attachment 2) and in "Draft Regulation amending Norwegian Regulations relating to plants and measures against pests of 1 December 2000" (Attachment 1).

2.1.6.2 Host plants growing in the PRA area

Many of the most susceptible host plants are commonly grown in Norway, both commercially and in private gardens, along roads and in recreation grounds. Commercial fruit growing is on a small scale. According to Statistics Norway (2005) approximately 1 600 ha of apples are grown in around 1 000 orchards, and 132 ha of pears in 353 orchards.

In addition, fruit growing in private gardens is substantial in many areas in Southern Norway, but there is no official record of this acreage. The table below is adapted from Statistics Norway (2005).

Table 1. Official records for fruit growing in Norway, adapted from Statistics Norway (2005).

	Fruit growers total	Area of fruit total (ha)	Number of growers		Area (ha)	
			apple	pear	apple	pear
In Rogaland county	96	83	54	19	40	8
In Hordaland county	389	901	352	156	565	53
In Sogn og Fjordane county	327	398	295	139	260	61
Totals for above counties	812	1382	701	314	865	122
Total for Norway	1287	2328	1067	353	1608	132

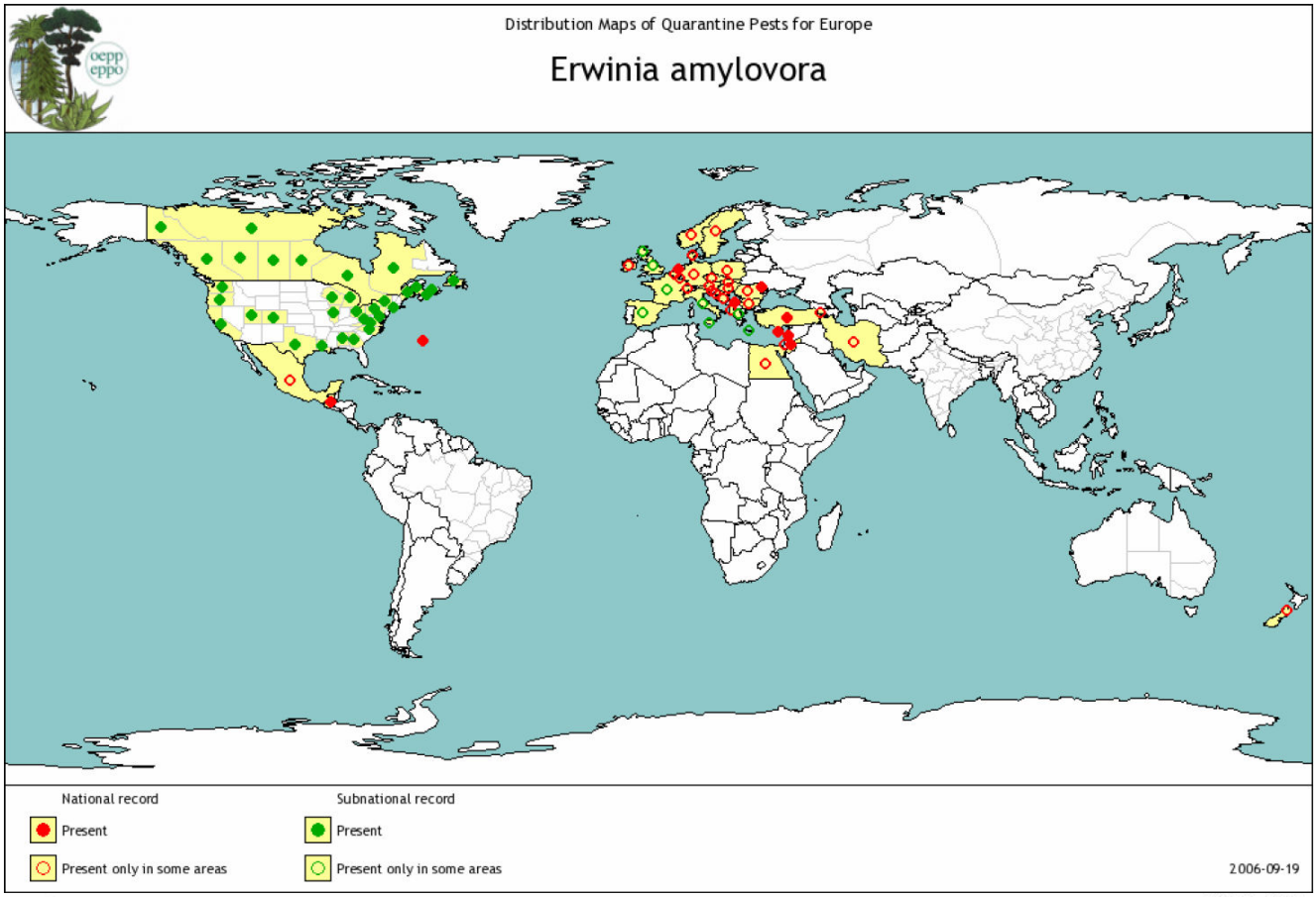
In the commercial production in 2005 the total yield of apple was 6 843 ton, and of pear 205 ton. Main apple cultivars are 'Aroma', 'Summerred' and 'Red Gravenstein', main pear cultivars are 'Philip' and 'Moltke'. The table below is adapted from Belt (2006).

Table 2. Norwegian fruit yield per year in different varieties of apple and pear.

		Yield per year (in ton)			
	Cultivar	**2002**	**2003**	**2004**	**2005**
Apple	Aroma	3328	1894	2349	1641
	Summerred	1862	1222	1549	1165
	Red Gravenstein	1901	1571	1858	1036
	Red Aroma	1001	606	926	741
	Gravenstein	1100	587	707	383
	Discovery	277	251	383	292
	Red Prins/Kronprins	630	479	441	291
	Julyred	299	299	317	283
	Åkerø	401	235	401	254
	Lobo	326	221	226	210
	Vista Bella	179	151	172	134
Pear	Philip	294	101	264	105
	Moltke	314	110	241	73
	Clara Frijs	50	16	43	10

2.1.6.3 Geographical distribution of fire blight in the world

The first known report of fire blight is from New York State in USA in 1780. Since then the disease has spread around the world, and is now reported from 46 countries (van der Zwet 2006). It came to England in 1954/55 (Billing & Berrie 2002), to the mainland of the European continent in 1966, and in subsequent years to most countries in Europe including Denmark, Sweden and Norway. Finland, Estonia and Latvia are still considered free from fire blight. The disease has also been reported from the Middle East, and from New Zealand (EPPO/CABI 1997). An outbreak in Australia in 1997 has successfully been eradicated (Rodini *et al*. 2002).



Erwinia amylovora

EPPO : A2 list

EU : Annex II/A2
Annex II/B

Europe	
Albania	B
Armenia	B
Austria	C
Belgium	B
Bosnia and Herzegovina	B
Bulgaria	B
Croatia	B
Cyprus	A
Czech Republic	B
Denmark	B
Estonia	H
France	B
Mainland France	B
Germany	B
Greece	A
Kriti	B
Mainland Greece	B
Hungary	B
Ireland	B
Italy	B
Mainland Italy	C
Sicilia	C
Latvia	H
Luxembourg	B
Macedonia, The Former Yugoslav Re	A
Moldova, Republic of	A
Netherlands	A
Norway	C
Poland	B
Portugal	H
Romania	C
Slovakia	C
Slovenia	B
Spain	B
Islas Baleares	H
Mainland Spain	B
Sweden	B
Switzerland	B
Turkey	A
Ukraine	K
United Kingdom	B
England	B
Northern Ireland	E
Scotland	C

Asia	
China	K
India	K
Maharashtra	K
Iran, Islamic Republic of	B
Israel	B
Japan	K
Hokkaido	K
Jordan	X
Korea, Republic of	K
Lebanon	A
Saudi Arabia	J
Syrian Arab Republic	K
Taiwan, Province of China	H
Viet Nam	J

Africa	
Egypt	B

North America	
Bermuda	X
Canada	A
Alberta	X
British Columbia	X
Manitoba	X
New Brunswick	X
Newfoundland	X
Northwest Territories	X
Nova Scotia	X
Ontario	X
Prince Edward Island	X
Québec	X
Saskatchewan	X
Yukon Territory	X
Mexico	B
United States	A
Alabama	X
California	X
Colorado	X
Connecticut	X
Georgia	X
Illinois	X
Louisiana	X
Maine	X
Maryland	X
Michigan	X
New York	X
North Carolina	X
Ohio	X
Oregon	X
Pennsylvania	X
Texas	X
Utah	X
Virginia	X
Washington	X
West Virginia	X
Wisconsin	X

Central America	
Guatemala	X

Caribbean	
Haiti	J

South America	
Chile	H
Colombia	J

Oceania	
Australia	E
South Australia	E
Victoria	E
New Zealand	B

X: Present, no details/Présent, pas de détail
A: Present, widespread/Présent, large répartition
B: Present, restricted distribution/Présent, répartition restreinte
C: Present, few occurences/Présent, rares signalements
(D): Absent, pest no longer present/Absent, organisme nuisible anciennement présent
(E): Absent, pest eradicated/Absent, organisme nuisible éradiqué
(F): Absent, intercepted only/Absent, interceptions uniquement
(H): Absent, confirmed by survey/Absent, confirmé par prospection
(J): Absent, invalid record/Absent, signalement invalide
(K): Absent, unreliable record/Absent, signalement douteux

Figure 3. Geographical distribution of fire blight in the world

2.1.7 Potential for economic consequences in PRA area

E. amylovora may kill flowers, shoots, branches and the whole tree. In orchards and nurseries the pest may cause epidemics, depending on the host plant species and cultivar, and the climatic conditions. The economic impact of fire blight is difficult to determine, as losses are not recorded when they are low. But the cost of the disease to individual fruit growers or nurserymen can be quite devastating, especially when one takes into account loss of well, established productive trees and the delay before replacements can reach equivalent productivity (Garrett 1990). The adoption in recent years of high-density orchard systems and planting of susceptible cultivars and rootstocks has increased the potential of substantial economic damage if fire blight is introduced (Norelli *et al*. 2003). New Zealand losses have been estimated to be at least NZ$ 10 million for the year 1998. In Italy, the same year, 500 000 fruit trees were destroyed due to fire blight (Vanneste 2000). A single fire blight epidemic in southwest Michigan in USA resulted in the death of over 220 000 trees and the removal of more than 240 ha of apple orchards, with a total economic loss estimated at $ 42 million. Annual losses to fire blight and costs of control in the USA are estimated at over $ 100 million (Norelli *et al*.2003). The cost of eradicating the outbreak of fire blight in Melbourne, Australia in 1997 was estimated at A$ 2.2 million, and in addition A$ 20 million in lost revenue in the Australian pome fruit and nursery industries (Rodini *et al*. 2006). During an eradication campaign in Hungary in 1996, more than 60 000 trees, mostly pear and quince, were uprooted and destroyed across the country (Nemeth 1999). The cost of eradication campaigns, control measures and compensation to growers have also been substantial in France, The Netherlands, Greece, United Kingdom, Germany and Denmark (Garrett 1990).

In Norway the total cost of the eradication campaign from 1986 to 2004 was around NOK 18 million (Norwegian Food Safety Authority 2006c).

Table 3. Cost of eradication campaign on a yearly basis from 1986 to 2004

(in NOK thousands)

1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
248	133	282	1055	1004	403	403	473	223	153	50

1997	1998	1999	2000	2001	2002	2003	2004	Total
48	100	100	2000	1000	2100	4647	3746	ca 18 000

In addition there have been substantial expenses to owners of private gardens, nurseries, municipalities and other government bodies in connection with the campaign.

In 2004 NOK 2.2 million, and in 2005 NOK 1.3 million have been paid in compensation due to outbreak of fire blight in the surroundings of 6 nurseries (Norwegian Agricultural Authority 2006a). The nursery production of host plants of fire blight is an economically significant industry, amounting in 2004 to NOK 58 million, with the total nursery production valued at NOK 285 million (Norwegian Food Safety Authority 2006c).

In the table below the value in NOK of the apple and pear production in the major fruit growing areas in Norway is calculated on the basis of ton of apple and pear delivered for sorting, sale or storage at fruit storage warehouses. In addition, some of the fruit production is sold directly to shops outside the warehouses. The average price at the warehouse was set at NOK 7 000/ton in 2003 and 2004 (Norwegian Food Safety Authority 2006c). According to Statistics Norway (2005) the total value for the entire country was NOK 78 million for apple, and NOK 5.5 million for pear.

Table 4. Value of the apple and pear production in the major fruit growing counties in Norway

	Rogaland county		Hordaland county		Sogn & Fjordane county		Total
	apple	pear	apple	pear	apple	pear	
Ton delivered in 2003	195	33	3 280	124	725	119	4 476
Ton delivered in 2004	216	74	3 737	276	975	238	5 516
*Value in 2003	1 365	231	22 960	868	5 075	833	31 332
*Value in 2004	1 512	518	26 159	1 932	6 825	1 666	38 612

*In NOK thousands

2.1.8 Conclusion of pest categorization

E. amylovora is established in the outer coastal areas on the West Coast of Norway (Figure 2). An eradication program run by the Norwegian Food Safety Authority is ongoing. So far, mostly ornamentals have been affected, and the damage is often substantial. Thus, there are favourable climatic conditions in these areas for development, survival and spread of fire blight. The only option for control of the disease would be destruction of diseased plants. Control of fire blight by spraying with chemicals or antibiotics is not allowed according to Norwegian regulations (Norwegian Food Safety Authority 2006d).

Several of the largest nurseries producing host plants are situated on the West Coast close to the city of Stavanger, and the potential for damage by fire blight is considerable. Great numbers of plants would have to be destroyed if damage occurred. Compensation may be paid, but some of the costs would have to be paid by the nursery itself (Norwegian Agricultural Authority 2006b).

Fire blight has not yet reached commercial fruit-growing areas in the inner part of the West Coast, or areas in Eastern Norway. If the disease was introduced there it could cause damage if weather conditions were favourable for disease development, but the magnitude of damage is difficult to assess. Some of the fruit-growing takes place in high-density orchard systems, and the damage, in particular on young trees could be substantial compared with experiences made in other countries. In smaller, more conventional orchards and private gardens the damage may be of minor importance, and could probably be compared with the damage and losses caused by apple canker, caused by the fungus *Nectria galligena*. However, fungal diseases can be controlled with pesticides, which is not an option with fire blight.

2.2 Assessment of the probability of introduction and spread

2.2.1 Probability of entry of the pest

2.2.1.1 Identification of pathways

As determined under section 1.1.1, this PRA is initiated by the review or revision of a policy and gives therefore no specific guidance about which pathways that are of concern. Consequently, all possible pathways identified are considered in this PRA. As long as *E. amylovora* is established in Norway, it could be useful to consider pathways at two levels; entry from other countries (long distance), and

entry from parts of the PRA area where the pest occurs (short distance). As described in chapter 2.1.5.3 about dissemination, *E. amylovora* is transmitted over long distances mainly by infected host plant material. Thus, the main pathway from other countries is by movement of plant material in the host range of *E. amylovora* (paragraph 2.1.6.1) originating in areas where the pest occurs (paragraph 2.1.6.3). Movement of machinery and equipment (paragraph 2.1.5.3) from areas where the pest occurs is another possible pathway. Movement of equipment in relation to international military exercise has relatively recently been identified as a general pathway for plant pests due to lack of cleaning after use in different countries. At the other level, i.e. entry from parts of the PRA area where the pest occurs, there will be the additional known specific pathway of movement of infected beehives, and by insects in general (bacteria adhered to insects). Dissemination on machinery and equipment is an even more important pathway at the short distance scale. Examples exist on spread of fire blight by vegetation control equipment operated by landscape gardeners from the Stavanger region in Norway. Likewise, vegetation cutting machinery for maintenance of roadside vegetation is a pathway when hosts infected with *E. amylovora* are present.

2.2.1.2 Probability of the pest being associated with the pathway at origin

The situation for *E. amylovora* is that all known outbreaks in the PRA area are under containment and eradication. It is not allowed to sell and plant *Cotoneaster bullatus* and *Cotoneaster salicifolius* in Norway. The phytosanitary and quality standard of the Norwegian production of host plants for fire blight are controlled by the Norwegian Food Safety Authority. It is not allowed to import into Norway plants or plant propagation material (except seeds) that is in the host range of *E. amylovora*. The importation of fruit to the PRA area from countries with or without fire blight is based on the ISPM No 7 export certification system (ISPM 1997). Travellers are allowed to bring in 10 kilogram of fruit in their hand luggage when travelling into Norway from abroad.

Table 5. Summary of pathways and the probability of the pest being associated with the pathway at origin. The regulatory status of the pathway in relation to the PRA area is added as supplementary information.

	Pathway	Probability	Regulatory status
Long	Movement of plants and propagation material in the host range	High	Not allowed
	Commercial importation of fruit	Very low	Export certificates
	Travellers importation of fruit	Low	Allowed (max 10 kg)
	Machinery and equipment	Moderate	No restrictions
Short	Movement of plants and propagation material in the host range	High	Restrictions
	Machinery and equipment	High	No restrictions
	Movement of beehives	High	Restrictions
	Dispersal by insects	Moderate	None

As described under section 1.3.1, the pathway of importation of fruit has been thoroughly scrutinised in a previous PRA by Biosecurity Australia (2006). The potential for spread of *E. amylovora* and fire blight via commercial apple fruit was also investigated by Roberts *et al.* (1998). For the case of apple export programs from United States and New Zealand to Japan, they estimated the likelihood of a new outbreak of fire blight in a previously blight-free area caused by movement of *E. amylovora* on commercial apple fruit to be one outbreak every 38462 years. This estimate was based upon the United States export protocol for Japan which consisted in the following fire blight security requirements:

(1) a 500 m buffer zone free of fire blight surrounding designated export areas

(2) three orchard inspections of all designated export areas and buffer zones, one at full bloom, one when fruit are 2-4 cm in diameter, and one before harvest, with additional inspections as required in the event of hail or hurricane

(3) disqualification from the export program if fire blight is detected in the designated export area or surrounding buffer zone

(4) fruit must be harvested into bins treated with 100 ppm free chlorine for 1 min that are stored separately from other fruit and labelled 'For Japan'

(5) prior to packing, apples are treated for not less than 1 min by immersion in a solution containing 100 ppm free chlorine

(6) packaging lines must be treated with chlorine dioxide or chlorine

(7) 5% of all containers are inspected before shipment

(8) a final inspection at the port of arrival

Under a 'relaxed' program without buffer zones, with one preharvest orchard inspection and allowing a low incidence of fire blight in export orchards, the estimate was one outbreak in 35971 years. And, if fruit were to be exported from any area, the estimate was one outbreak in 11364 years. On this basis Roberts *et al.* (1998) judged the risk of importing *E. amylovora* on commercial apple fruit as insignificant. In a follow-up study, Yamamura *et al.* (2001) re-estimated the probability of introduction taking variability in the proportion of infected fruits from different production areas into account. They showed that with some modification of the assumptions, the estimated time required for the invasion (ETI) of fire blight was 1707 years based on the same data as Roberts *et al.* (1998). And, if variability of infections was taken into account, the estimate of ETI was 334 years.

2.2.1.3 Probability of survival during transport or storage

See paragraph 2.1.5.4.

2.2.1.4 Probability of pest surviving existing pest management procedures

Imported consignments of fruit accompanied by phytosanitary certificates are not subjected to any management procedures in Norway, whether they originate in countries where *E. amylovora* is known to occur or not. Paragraph 2.2.1.2 describes pest management procedures and regulatory actions in force to reduce the survival of *E. amylovora*.

2.2.1.5 Probability of transfer to a suitable host

In the previously mentioned calculations by Yamamura *et al.* (2001), they applied an estimate on the probability that *E. amylovora* is transferred from fruit to a new host in the range from 0.001 to 0.00001. When adopting the upper end of this interval, their estimate of ETI was 34 years, while the lower end gave ETI = 3334 years. For the probability that fruits are discarded or placed near host plants, Yamamura *et al.* (2001) argued that this probability will fluctuate depending on the spatial relation between host plants and the place of consumption (e.g. the behaviour of discarding apple cores from infected fruit directly in an area of a garden where susceptible plants grow will yield a high probability). However, Norway has a very long history of importing fruits. No examples are known on transfer of *E. amylovora* from imported fruit to host plants growing in the PRA area. Thus, the probability of *E. amylovora* to transfer from imported fruit to suitable host is considered very low and may be ignored.

For the pathway of plants and propagation material in the host range of *E. amylovora*, the pest would already be on a suitable host or be placed on one.

For the pathway of dispersal of *E. amylovora* by insects, including movement of beehives, the probability of transfer to a suitable host will be very high, as insects are of the most efficient means of dispersal for fire blight. For the pathway of equipment and machinery, the probability will be substantially lower than for insects, and therefore considered either moderate or low dependent of the kind of machinery.

2.2.1.6 Availability of suitable hosts, alternate hosts and vectors in the PRA area

Many of the most susceptible host plants are commonly grown in Norway, both commercially and in private gardens, along roads and in recreation grounds. The geographical distribution of commercial fruit growing and nurseries is illustrated in Figure 2 and the acreage is given in Table 1. However, in addition to the availability of suitable host plants, a very important factor, especially in colder climate, will be the availability on host plants of tissue susceptible for infection (e.g. open flowers, fresh shoots and wounds). For the potential establishment of fire blight in the fruit-production areas of Norway this is a key issue. Therefore, the phenology of the most grown varieties of apple and pear was investigated in the main fruit districts during the growing season 2006. The registrations were made by agricultural extension service officers and Bioforsk personnel. The results from the investigation is given in Table 6 and illustrated graphically in Figure 5. In addition to recording the stages of bud break, early blossom, full blossom and petal fall, the potential event of record secondary blooming (Figure 4) was looked for throughout the season.

Figure 4. Secondary blooming in apple (left photo by J. Børve) and pear (right photo by S. H. Hjeltnes)

Table 6. Phenological observations in apple and pear collected in the main commercial fruit growing districts of Norway during the 2006 growing season. This work was commissioned by the Norwegian Food Safety Authority.

			 Green tip / bud break	 Early blossom	 Full bloom	 Petal fall 100%	Secondary blooming
Apple	Summerred	Njøs		May 19th	May 25th	June 2nd	
		Ulvik	April 25th	May 19th	May 23rd	June 8th	
		Hesthammar	April 17th	May 10th	May 20rd	June 4th	
		Kvam	April 21st	May 16th	May 19th	May 30th	
		Lofthus	April 20th	May 18th		June 6th	
		Gvarv	April 28th	May 13th	May 19th	May 29th	No
		Lier	April 27th	May 22nd	May 24th	June 7th	
		Svelvik	April 25th	May 19th	May 24th	June 5th	
	Aroma	Njøs	May 2nd	May 28th	June 2nd	June 10th	
		Ulvik	May 2nd	May 29th	June 1st	June 11th	
		Hesthammar	April 25th	May 23rd	May 29th	June 11th	
		Kvam	April 17th	May 10th	May 20th	June 2nd	
		Lofthus	May 2nd		May 23rd	June 9th	
		Gvarv	May 5th	May 24th	June 1st	June 8th	No
		Lier	May 3rd	May 26-27th	May 30-31st	June 7th	Yes, September 19th
		Svelvik	May 1st	May 24th	May 29th	June 9th*	
Pear	Moltke	Hesthammar	April 17th	May 10th	May 20th	June 2nd	
		Gvarv	April 28th	May 14th	May 18th	May 29th	No
		Njøs	April 30th	May 14th	May 22nd	June 1st	
	Clara Frijs	Kvam	April 23rd	May 16th	May 19th	May 30th	
		Lofthus	May 2nd	May 18th		June 1st	
		Njøs	April 30th	May 19th	May 22nd	June 1st	
	NA	Ulvik	April 23rd	May 16th	May 21st	June 3rd	

* Red Aroma

For the locations Ullensvang and Njøs, both located in the inner fjord districts of South-west Norway, historical records of phenology in apple and pear are available and obtained from Bioforsk (pers. comm. M. Meland and S. Hjeltnes respectively for data from Ullensvang and Njøs). The historical variation in phenology of apple and pear at Ullensvang and Njøs are illustrated in Figure 6.

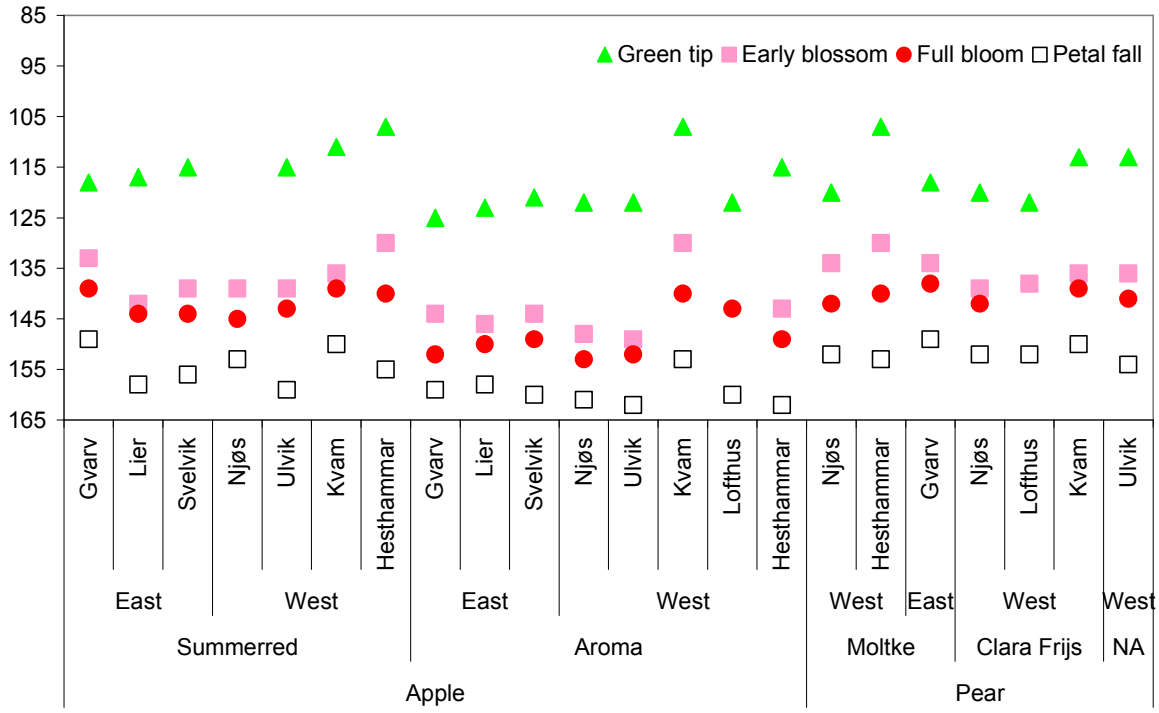


Figure 5. Phenology in apple and pear in 2006. Day of year on the ordinate axis.

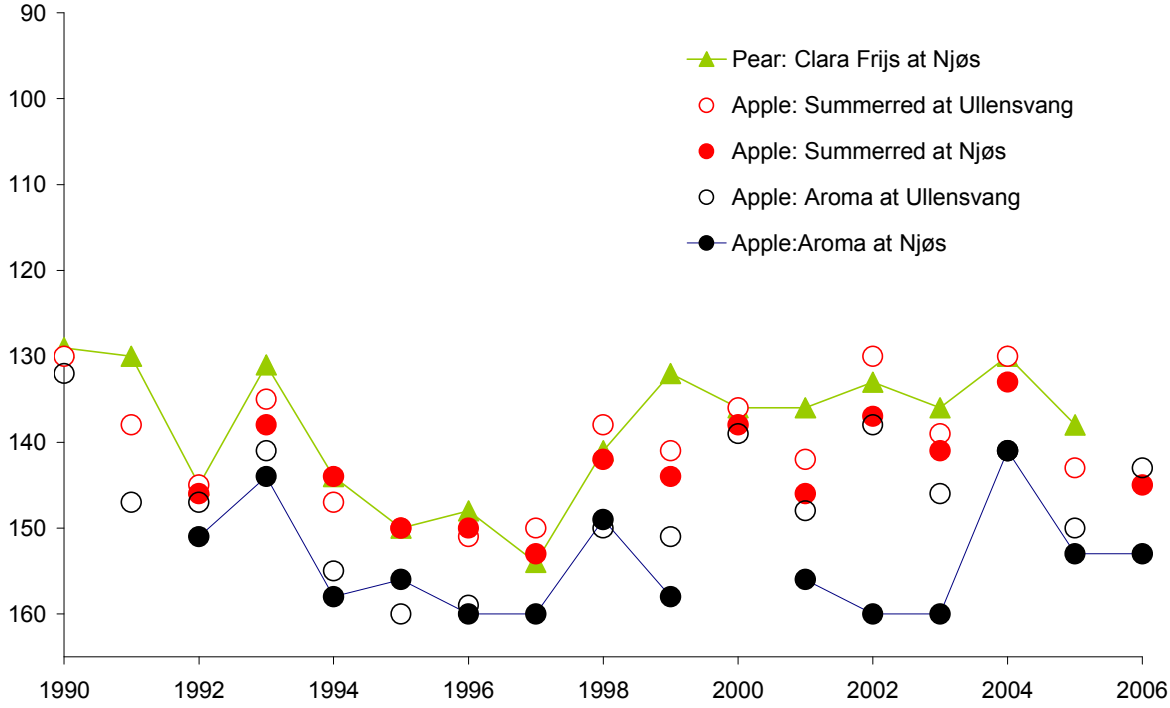


Figure 6. Historical variations in day of year of the full bloom phonological stage in two apple varieties and one pear variety at two different locations; Njøs at the Sognefjord and Ullensvang at the Hardangerfjord in Norway. Lines are added to the earliest and the latest.

2.2.1.7 Suitability of environment

As described in the paragraphs 2.1.3 and 2.1.8 of the pest characterization, *E. amylovora* is established in the outer coastal areas on the West Coast of Norway (Figure 2). Thus, the environment of the PRA

area is at least suitable for the pest in these parts of the PRA area. However, fire blight has not yet reached the areas in which pest introduction will have its largest damage potential, the commercial fruit-growing areas located in the inner part of the West Coast and areas in Eastern Norway (Figure 2). A key question is therefore whether the climate in these areas will prevent the establishment of fire blight.

Many fire blight risk assessment systems and models have been developed for the purpose of operational disease-forecasting during the growing season. Billing (2000) reviewed twelve of these models and distinguish between those developed in the USA and those developed in Europe. Most of these models are described in a systematic way in an online database hosted by University of California – Agriculture and Natural Resources (University of California, 2005). With such a well developed model base, it is an obvious idea to utilise these models for another purpose than they originally were developed for, namely, prediction of climate suitability for areas where fire blight not have occurred.

Climate plays a central role in the epidemiology of *E. amylovora*. But, fire blight occurs in a variety of climatic areas, ranging from semi-arid to areas with warm wet springs, and spring and summer storms (Bonn & van der Zwet 2000). For the purpose of evaluating the suitability of climate in areas of Norway where fire blight has not occurred, we found that the models developed under European conditions, and Billing's Integrated System (BIS) in particular (Billing 1996), to be the most appropriate. This evaluation was based on the two information sources mentioned above (Billing 2000; University of California, 2005). The main reason for the selection of BIS is because it has been developed and validated in England, which has similar climate conditions to South-Western Norway and is close geographically to Norway. On the other hand, BIS is known to be flexible enough to be applied to all hosts in all climatic areas.

The Agrometeorological Service of Bioforsk operate weather stations at all the locations where the phenology registrations in Table 6 were made. The weather data can be downloaded for free from http://lmt.bioforsk.no.

The BIS model identifies potential infection days for blossom blight by indicating days when weather is favourable for infection. The model uses two types of degree-day calculations, which are counted and summed on a daily basis.

DD18 = the sum of daily values of 1.0 °C or more above 18 °C for the maximum temperature. If the maximum daily temperature is 21 °C then 3 is added to the DD18 sum. If the maximum temperature falls to 16-17 °C for two days or to 15 °C or lower for one day, the DD18 sum is reset to zero.

DD13 = the sum of daily values of 0.5 °C or more above a 13 °C mean. DD13 calculations begin on the day after each infection risk (IR) day.

While the degree day sum DD18 is used to indicate potential infection days, the DD13 is used to calculated date when early blight symptoms might be seen. The threshold sum of DD13 for when early blight symptoms might bee seen is different for apple than for other host plans such as pear. For apple blossom blight the DD13 threshold sum is 47 and for fire blight on all other hosts following direct infections of blossoms or shoots the DD13 threshold sum is 17. The following symbols are used **b**: infection risk - DD18 sum between 17 and 33 with mean temperature 15 °C or more and dew, trace or more rain (< 3 mm) (insect spread). **B**: high infection risk - DD18 sum 34 or more with mean temperature 15 °C or more and dew, trace or more rain (< 3 mm); or DD18 sum 34 or more with maximum daily temperature 27 °C or more or daily mean temperature 20 °C or more (insect spread).

?: Possible infection risk when b and B conditions fulfilled but there are no dew, trace rainfall records (insect spread). **r**: infection risk – warmth and wetness (WW) score 2 - 6. Localised spreading of ooze by rain. **R**: **b** or **B** in addition to the situation **r**. See Billing (1996) for further details. The results for potential blossom blight days describe the level of climatic suitability for *E. amylovora* infection. Given that inoculum of *E. amylovora* is present on such days, actual infections may only take place if those potential infection days coincide with an abundance of susceptible host tissues, e.g. open flowers.

Table 7. Results from BIS for number of blossom blight days in apple for 2006.

			Potential blossom infection days				
	Location	BIS symbol	**?**	**b**	**B**	**r**	**R**
Aroma	Njøs						
	Ullensvang - Lofthus						
	Lier						
	Svelvik						
	Gvarv						
	Kvam						
	Ulvik		2		1		
	Hesthammar		2				
Summerred	Njøs						
	Ullensvang - Lofthus						
	Lier						
	Svelvik						
	Gvarv						
	Kvam						
	Ulvik						
	Hesthammar						

The results in Table 7 indicate when potential infection days coincided with open flowers in the 2006 season. For Ulvik the flowering period of the apple variety Aroma contained one potential high infection risk day of category **B** and two days of possible infection risk category **?**. For Hesthammar the flowering period of the apple variety Aroma contained two days with possible infection risk category '**?**'. The pattern in the results from BIS in 2006 is that the flowering generally occurs too early for infection of fire blight. Later in the growing season, from about mid June and onwards the BIS model indicates several periods of blossom infection, including the highest infection potential categories.

For two of the locations included in the 2006 study, there was historical records of phenology available. In order to study annual variations in blossom blight infection potential, BIS were applied to the last 10 years from 1997 – 2006. Results are given in Table 8. For the location Njøs, there has been overlap between periods of blossom infection according to BIS and blooming in one of the apple varieties investigated in 2 of the last 10 years. For the location Ullensvang the result was 1 out of 9 years. General findings in the results are that later and slightly longer periods of flowering in Aroma compared to Summerred result in overlap between periods of potential blossom infection according to BIS and observed blooming for Aroma in some years. In case of presence of inoculum of *E. amylovora*, this will have the result that Aroma will get blossom blight more frequently than Summerred under the climate conditions at Njøs and Ullensvang.

Table 8. Annual variations in number of potential blossom infection days within period of bloom in the apple varieties Aroma and Summerred at Njøs and Ullensvang.

		1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Njøs	Aroma	6			na		5				
	Summerred									na	
Ullensvang-	Aroma	na	2								
Lofthus	Summerred	na									

na = Not sufficient information available

The conclusion based on these climate comparisons is that the climate of the PRA area in most years will prevent fruit tree blossom infection of *E. amylovora*. The same results have been obtained for pear (not shown), but with less data. Other non-climatic environmental factors such as soil, natural enemies, competitors etc. is not known to not prevent the establishment of *E. amylovora* in the PRA area.

2.2.1.8 Cultural practices and control measures

There are no known differences in practices employed during the cultivation and production of fruit between the PRA area and the pathway origins that are likely to influence the ability of *E. amylovora* to establish in the PRA area. However, the introduction of new restrictions (risk management) on cultivation practices may influence the ability of *E. amylovora* to establish in the PRA area e.g. expansion of the restrictions on the movement of beehives.

2.2.1.9 Other characteristics of the pest affecting the probability of establishment

Billing (2000) stated that fire blight is a sporadic disease in space and time. On the basis of the results from studies on the potential for blossom blight, this seems to be the situation for fire blight establishment potential in fruit trees in Norway as well.

2.2.2 Probability of spread after establishment

The experience with fire blight in Norway assumes that spread by insects and movement of beehives from fire blight areas cause a high probability of spread of fire blight after establishment. Likewise, movement of equipment for vegetation control in gardens and parks, and roadside vegetation cutting machinery from fire blight areas to areas free of fire blight cause a high probability of spread.

2.2.3 Conclusion on the probability of introduction and spread

Major efforts in this PRA work were invested in utilising the knowledge accumulated in fire blight warning models used operationally in areas experiencing fire blight epidemics. The result from this work tells that the primary flowering of apple and pear in Norway does generally not overlap with periods with suitable climate for blossom infection according to BIS. However, examination of Norwegian weather data records with BIS reveals frequent periods with suitable climate for infection, occurring from mid June and onwards. For infections in apple and pear to take place in these periods, *E. amylovora* has to infect secondary blossoms or less susceptible tissue, such as fresh shoots and wounds (e.g. caused by strong wind or hail). Phenology registrations in Norwegian apple and pear production from the 2006 growing season show that secondary blooming is infrequent in the main varieties. The picture of secondary blooming in the pear variety Super Trévoux (Figure 4) was taken at

Njøs on July 8th 2006. Looking into the results from BIS for Njøs for that period of time show that the dates from July 1st to July 7th and the date July 10th consist in five (**B**) high bloom infection risk days and three (**?**) possible bloom infection risk days.

The successful establishment of fire blight on *C. bullatus* and *C. salicifolius* at the south-west coast of Norway is most likely explained by the later and longer flowering periods of these species, making them more susceptible than apple and pear under Norwegian climate conditions. Systematic phenological observations on Cotoneaster-species are not available. Usually *C. bullatus* starts flowering in the first two weeks of June, and continue producing new flowers until the end of August. If fire blight is introduced on *C. bullatus* and *C. salicifolius* growing in the major fruit districts, this will cause a high infection pressure of fire blight in these areas, and then cause problems with fire blight in the fruit production when conditions are suitable for infection, although infrequently. The strategy of eradication of *C. bullatus* and *C. salicifolius* from the major fruit production districts will greatly reduce the probability of introduction of fire blight to these areas.

2.2.3.1 Conclusion regarding endangered areas

Because fire blight epidemics in Norway will have less impact than in areas where the climate is more suitable, it is expected that introduction of *E. amylovora* will have minor impacts on the commercial fruit production and nurseries.

2.3 Assessment of potential economic consequences

The basis for the assessment of potential economic consequences is the quantitative information provided in section 2.1.7 Potential for economic consequences in PRA examined in light of the results from section 2.2 Assessment of probability of introduction and spread.

2.3.1 Pest effects

2.3.1.1 Direct pest effects

Fire blight is the most devastating disease of pome fruit. Surprisingly there is only minimal data available about the economic impact of the disease with most estimates relating to losses expressed as a percentage or dollar amounts recorded as personal communications (Bonn and van der Zwet 2000). Fruit production losses in orchards with fire blight outbreaks have been reported to be from 25 – 50 % (Talbert 1925). However, the economic loss due to fire blight involves direct pest effects beyond the crop yield losses. Fire blight control, inspection and autumn fire blight control all contribute to high pest management costs. Young orchards may be wiped out by fire blight outbreaks (Talbert 1925). Nursery production of host plants for fire blight is another production that may suffer from significant control and eradication costs in case of an outbreak.

For Australian conditions, the economic impact of a fire blight outbreak in Australia's largest pome fruit growing district (Gouldburn Valley, Victoria) was calculated (Rodoni *et. al.* 2006). Two separate scenarios were considered. In the first scenario an outbreak with 30 % yield losses is eradicated within five years. The total cost of this scenario to the Australian society, expressed in lost national aggregate consumption, was A$260 million in net present value. In the second scenario an outbreak is not eradicated and pome fruit output in the Goulburn Valley declines by up to 50 % for pears and 20 % for apples. The total cost of the second scenario was A$870 million in net present value. This indicates, at least for Australian conditions, that eradication of fire blight is the most economic pest management approach for fire blight outbreaks.

Section 2.1.7 lists several cost estimates connected to other direct pest effects from the countries New Zealand, Italy, USA and Australia. Introduction of fire blight to the Norwegian fruit districts would increase pest management and control costs and reduce producer profits.

2.3.1.2 Indirect pest effects

Norwegian pome fruit is produced for the domestic market only. Norway maintains some market regulations in order to protect its domestic production from the strong competition from imported fruit during the main season. The domestic market share for Norwegian apples is approximately 15 % and has decreased by 50 % during the last twenty years. Fire blight outbreaks in the Norwegian fruit production may have a strong impact on an already strained business. The fruit growing districts in South Western Norway is located in the famous landscapes of the fjord districts of the west coast. The flowering of the fruit trees in the spring and the local supply of fresh fruit during harvesting are important tourism attractions. Reduction in the fruit growing area due to economic impacts from potential fire blight outbreaks would reduce the value of these tourist attractions. Experience from other countries (e.g. Australia) shows that even consumer demand for apples and pears may drop off due to concerns about the impact of fire blight on human health.

Fire blight damage to public and private gardens may be substantial. Several *Cotoneaster spp.* are very popular in private gardens. Although planting of the two most important host plant species for fire blight are prohibited, there is still a lot left to be removed. Presence of fire blight in *C. bullatus* and *C. salicifolius* may provide a high infection pressure that may damage the other *Cotoneaster spp.* as well. A cost estimate does not exist, but a private garden owner may have to replant at a cost of 1-5000 NOK. In public gardens the costs will be higher, because of larger area and a frequent use of *Cotoneaster spp.* as hedges and slope coverage. In Switzerland fire blight has damaged creeping *Cotoneaster spp*. This has not been recorded in Norway, but is assumed to be related to the lower infection pressure here.

2.3.2 Analysis of economic consequences

In a hypothetical worst-case scenario, where fire blight is fully expressing its potential economic consequences, i.e. crop losses of 50 % for pears and 20 % for apples, will give a yearly loss of 18.1 million NOK.

value of pear production is 5.5 million x 50% loss = 2.5 million

+ value of apple production is 78 million x 20% loss = 15.6 million

= yearly crop loss value of 18.1 million

The above example is most likely a too pessimistic scenario under Norwegian conditions, even as worst-case scenario. However, it is interesting to see that the accumulated cost of the nineteen years fire blight eradication campaign in Norway (Table 3) may equal the costs of only one year with crop loss from a massive fire blight outbreak scenario in the fruit growing areas. Including more direct pest effects and indirect pest in this scenario will increase the potential expected losses significantly. The next largest threat from further spread of fire blight is the potential damage to the nursery industry. Norwegian production of fire blight susceptible host plants constituted 20 % of the total value the nursery production of 285 million NOK (2004 numbers taken from Norwegian Food Safety Authority 2006c). Because large parts of the nursery production is located in or close to the areas of Norway where fire blight is established, the risk to the nursery industry is likely to be higher than the fire blight risk to the fruit production.

The results from the study of blossom infection potential (Table 8) indicated a frequency of one to two out of ten years, may have periods with blossom infection potential for apple. In a scenario with no restrictions to prevent spread of fire blight in Norway and presence of *Cotoneaster spp.* in the fruit districts providing a background disease pressure, we would get a recurring problem with fire blight in the Norwegian fruit production, though most likely with a lower frequency of outbreaks than in warmer climates. On the other hand, future climate scenarios indicate increased temperatures for Norway, which again may increase the frequency of years with climate conditions favourable for blossom infection.

2.3.3 Conclusion of the assessment of economic consequences

The result from the analysis of economic consequences points in the same direction as the results from the analysis of Rodoni *et. al.* (2006) mentioned in section 2.3.1.1, where action against fire blight, despite of high costs, gave the best economic result in the long run compared to the scenario where fire blight was not eliminated.

2.3.3.1 Endangered area

The endangered area, where presence of fire blight will result in economically important loss is the commercial fruit growing areas of Norway (Figure 2).

2.4 Degree of uncertainty

The prediction of establishment potential based on blossom blight simulations relies on a number of assumptions (Billing 2000). The observations of phenology have been made by several different personnel which may be a source of uncertainty due to systematic differences and subjectivity between them. However, the fact that the pest has been established in parts of the PRA makes the level of uncertainty low regarding the conclusions in this PRA. Furthermore, fire blight is a well known disease, and this PRA has taken advantage of the rich availability of scientific knowledge of this pest. The resources available for the work with this PRA were prioritised for the analysis of establishment potential and work with preparing climate data for this analysis. The alternative would have been to make a more in-depth economical analysis. However, the latter would have little value if the biological risks to the PRA area were unknown. For the future prioritising of the efforts to invest in preventing introduction and further spread of fire blight, an estimate of yearly expected costs for maintaining different levels of protection from fire blight could be valuable. Such an analysis should include the range from the highest phytosanitary level (Pest Free Area) to the lower with no national coordinated efforts or regulations. However, such information is not likely to affect the question whether to give up fighting fire blight in Norway.

2.5 Conclusion and summary of the pest risk assessment

If *E. amylovora* is introduced into the main fruit growing districts, it is expected that the damage and losses to commercial fruit production and nurseries will be minor, under the current phytosanitary regime in Norway.

Relaxation of the regulations in force for fighting fire blight in Norway will increase the expected damage and losses to commercial fruit production and nurseries to a moderate level.

Importation of fruit trees and fruit tree propagation material from countries where fire blight is established is not expected to increase the risk of fire blight in Norway significantly, given that appropriate phytosanitary requirements and post entry quarantine are followed.

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http://www.slf.dep.no/portal/page?_pageid=53,418134&_dad=portal&_schema=PORTAL&p_d_i=-201&p_d_c=&p_d_v=2184&p_d_i=-181&p_d_c=&p_d_v=2184&p_d_i=-522&p_d_c=&p_d_v=2184&p_d_i=-381&p_d_c=&p_d_v=2184&p_d_i=-283&p_d_c=&p_d_v=2184&p_d_i=-301&p_d_c=&p_d_v=2184

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Attachment 1

(Unofficial translation)

Regulation amending Regulations relating to plants and measures against pests of 1 December 2000 no 1333

Laid down by the Ministry of Agriculture and Food on 30 January 2006, pursuant to the Act of 19 December 2003 No. 124 relating to Food production and food safety section 18

I

The Regulations relating to plants and measures against pest of 1 December 2000 no 1333 are amended as follows:

In § 19 the second paragraph is replaced by the following:

The import of up to 50 small packages (of maximum 30 g) of horticultural seeds, as well as small amounts of plants and parts of plants mentioned in Annex 9, is exempt from certification when brought in by travellers as hand luggage or as removal load. The import of up to 50 small packages (of maximum 30 g) of horticultural seeds by mail is also exempt from certification. Plants and parts of plants imported under this provision can only be brought in for personal use and are not permitted to be used for commercial purposes.

In Annex 2 point 3 under Bacteria is replaced by the following:

3	*Erwinia amylovora* (Burrill) Winslow et al.		Plants (other than seeds) and live pollen for pollination of *Amelanchier* Medik., *Aronia* Medik., *Choenomeles* Lindl., *Cotoneaster* Medik., *Crataegus* L., X *Crataemespilus* E.G. Camus, *Cydonia* Mill., *Eriobotrya* Lindl., *Malus* Mill., *Mespilus* L., *Photinia* Lindl., *Pyracantha* M.J.Roem., *Pyrus* L., *Sorbus* L. and *Stranvaesia* Lindl.

In Annex 3 point 6.1 is replaced by the following:

6.1	*Amelanchier* Medik. *Aronia* Medik. *Choenomeles* Lindl. *Cotoneaster* Medik. *Crataegus* L. X *Crataemespilus* E.G. Camus *Cydonia* Mill. *Eriobotrya* Lindl. *Malus* Mill. *Mespilus* L. *Photinia* Lindl. *Pyracantha* M.J. Roem. *Pyrus* L. *Sorbus* L. *Stranvaesia* Lindl.	Plants (other than seeds and fruit), but including live pollen for pollination	Countries where *Erwinia amylovora* (Burrill) Winslow et al. is known to occur

In Annex 4B point 1 is replaced by the following:

1	Plants intended for planting (other than seeds) of - *Amelanchier* Medik. - *Aronia* Medik. - *Choenomeles* Lindl. - *Cotoneaster* Medik. - *Crataegus* L. - X *Crataemespilus* E.G. Camus - *Cydonia* Mill. - *Eriobotrya* Lindl. - *Malus* Mill. - *Mespilus* L. - *Photinia* Lindl. - *Pyracantha* Roem. - *Pyrus* L. - *Sorbus* L. - *Stranvaesia* Lindl.	Without prejudice to the provisions applicable to Annex 7, There is an official statement that a) the plants originate from areas recognised to be free from *Erwinia amylovora* (Burrill) Winslow et al. and b) the place of production is under official control for *Erwinia amylovora* (Burrill) Winslow et al.

In Annex 4B point 9 is replaced by the following:

9	Plants intended for planting (other than seeds) of *Dianthus* L.	Without prejudice to the requirements applicable to Annex 4B, point 7: There is an official statement that: a) the plants are derived in direct line from mother plants which were found free from *Erwinia chrysanthemi* Burkholder et al. pv. *dianthicola*, *Burkholderia caryophylli* (Burkholder) Yabuuchi et al. and *Phialophora cinerescens* (Wollenweber) van Beyma by means of officially-approved tests carried out at least once within the last two years, and b) no symptoms of the said pests have been observed on the plants.

II

This regulation enters into force immediately.

Attachment 2

Regulations relating to plants and measures against pests

Laid down by the Ministry of Agriculture 1 December 2000, pursuant to the Act of 23 June 2000 no. 53 on plant health and the Act of 4 December 1970 on seeds and the Act of 12 May 1995 no. 23 on soil, section 3.

(Amended: April 10th, 2002).

I. Purpose, scope and definitions

§ 1 Purpose

The purpose of these regulations is to prevent the introduction and spread of pests and control any outbreaks in Norway and safeguard the production and sale of plants intended for planting of the best possible health and satisfactory quality.

§ 2 Scope

These regulations lay down requirements and provide provisions for inspection regarding plant health of plants and other regulated articles.

Furthermore, the regulations also lay down requirements and provide conditions for inspection for quality and the labelling of plants intended for planting. For seeds, seed potatoes and forest plants, the Act on seeds, the Act on seed potatoes and the Act on forest seeds and plants apply. These categories, as well as plants intended for planting, which are cultivated separately for export purposes, are exempt from the conditions in sections 10 - 14 of these regulations.

§ 3 Definitions

A glossary of words and expressions used in these regulations are provided in Annex 10.

II. Provisions regarding measures against regulated pests

§ 4 Regulated pests which are forbidden to spread

It is prohibited:

a to spread the pests mentioned in Annex 1

b to spread the pests mentioned in Annex 2 if these occur on plants and other regulated articles specified in the Annex.

§ 5 Specific requirements for preventing the spread of regulated pests

Plants and other regulated articles mentioned in Annex 4B may only be sold or otherwise disposed of on condition that these fulfil the requirements specified in the Annex.

It is prohibited to plant or sell plants intended for planting mentioned in Annex 7.

§ 6 Laying down phytosanitary measures

The Norwegian Agricultural Inspection Service is permitted, in the case of there being a risk of spreading regulated pests mentioned in Annexes 1, 2, and 6, to lay down measures to be carried out in order to eradicate, prevent or limit the spread of the pests. With these objectives, the Norwegian Agricultural Inspection Service may, amongst other measures:

a forbid or set conditions for the disposal of plants and plant material
b order the destruction of plants and plant material
c order the disinfection and other measures to eradicate or control possible contamination
d lay down quarantine restrictions on fields
e forbid machine co-operation
f forbid the sowing or planting of certain species of plants
g order crop rotation.
h determine safety zones and implement the above-mentioned measures within these.

III. Registration scheme

§ 7 Registration obligation

The following kinds of businesses shall be registered at the Norwegian Agricultural Inspection Service:

a businesses involved in the production, including here as well storage in excess of five months, of nursery plants for sale
b businesses involved in the production of other plants intended for planting, for sale to a retail link or for other commercial cultivation
c businesses involved in the sale of plants intended for planting, for sale to another retail link or for commercial cultivation
d businesses which import plants and other regulated articles mentioned in Annex 5, points 1, 2, 4.2, 4.3 and 8
e businesses which export goods requiring a phytosanitary certificate
f businesses which receive potatoes or unwashed vegetables with roots for sorting, packaging or industrial processing.

The Norwegian Agricultural Inspection Service may, under the first subsection, point a, order other businesses which are involved in the sale of nursery plants to register, if the businesses' operations are viewed as representing a particular plant health risk.

It is prohibited to carry out the activities listed in the above-mentioned points a – f unless a business is registered at the Norwegian Agricultural Inspection Service.

Businesses which are not bound to register in accordance with the Act on value-added tax are not bound to register in accordance with the Regulations relating to plants and measures against pests either.

§ 8 Registration

In order to be registered, a business has to fill in a regulation form from the Norwegian Agricultural Inspection Service. If a company consists of several economic units, each individual unit shall be registered. Units within the same company, which are run separately, shall also be registered individually.

The Norwegian Agricultural Inspection Service shall be informed in writing in the event of a registered business:

a ceasing to exist
b changing ownership
c changing its name or address
d ceasing the activity which required registration.

§ 9 Internal controls

Registered businesses are obliged to carry out internal controls. The staff responsible for the business shall see that the mandatory internal controls are carried out. An internal control of the business means that the business shall:

a be clear as to the organisation and relation of accountability
b have the necessary documentation concerning production, sale, import and export
c map the risk of contravening conditions in the applicable regulations in relation to the business' activities and initiate measures to reduce this risk
d have routines for uncovering, correcting and preventing repeat episodes of contravention

e go through the internal control systematically to ensure that everything is functioning as expected.

The above-mentioned points shall be documented in writing in such a form and extent as necessary based on the business' type, activities, risk and size. Documentation shall be made available to the Norwegian Agricultural Inspection Service.

Registered businesses shall ensure that inspection in accordance with the conditions of the regulations can be carried out as thoroughly and as quickly as possible, during which ensuring any necessary assistance.

In order to ensure that the conditions in the applicable regulations are upheld, the Norwegian Agricultural Inspection Service can order the initiation of measures to be carried out and demand further documentation if a business' internal control is inadequate.

The Norwegian Agricultural Inspection Service can lay down more detailed conditions regarding the content of an internal control.

IV. Special provisions regarding the production and sale of plants intended for planting

§ 10 Quality requirements

Plants intended for planting shall, on sale,

a in addition to the provisions laid down in section 4, be practically free of other pests than those mentioned in Annexes 1 and 2, if these could have an impact on the plants' quality and use
b be satisfactorily developed and do not contain any defects which are of significance for further use
c be typical examples of the species and varieties and have the intended characteristics of the variety.

Plants intended for planting, which during production or sale show visible symptoms of a pest which could have an impact on the plants' quality and use, shall, as soon as the presence of the pest has been confirmed, be treated in a suitable manner or removed. The plants intended for planting may not be sold before the pest has been controlled.

§ 11 Requirements concerning the identity and varietal purity

The origins of plants intended for further commercial cultivation shall be known and the plants shall be of satisfactory purity relative to the specified species, variety or clone in question. These plants intended for planting, labelled with the name of their variety, may only be presented for sale if the variety is:

a legally protected, or
b officially listed, or
c commonly known, or
d adequately described in relation to accepted standards for descriptions of varieties, if such exist, and the supplier is able, if required, to provide such a description and also documentation for the applied system of variety maintenance and propagation.

For varieties propagated by seeds, the provenance can be stated.

The production and sale of genetically modified plants intended for planting is only permitted if these have been approved in Norway in accordance with the Act relating to the production and use of genetically modified organims.

§ 12 Certified production

The Norwegian Agricultural Inspection Service may set requirements for the authorisation of businesses producing or selling certified plant material, as well as rules for the production of an individual culture. Plants intended for planting must be produced in accordance with these conditions. Plants intended for planting, which have been produced in Norway, can be approved in the following categories:

a *Nuclear stock* – if these originate directly from plants which have been tested according to guidelines laid down by the Norwegian Agricultural Inspection Service at an approved laboratory, are found to be free from specific pests and have been maintained and produced in accordance with applicable regulations.

b *Propagation stock* – if these have been produced either directly from nuclear stock or from plants which are vegetatively propagated from nuclear stock in a specified number of generations and which are maintained and produced in accordance with applicable regulations.

c *Certified stock* – if these have been produced from nuclear stock or propagation stock.

Only the lowest category is generally approved in the case of plants intended for planting which have been produced by a business carrying out production of several categories. Plants intended for planting, which have been produced in other countries, can be approved in the above-mentioned classes if production procedures in the country in question are equivalent to those implemented in Norway.

Propagation stock shall be delivered in new packaging. During distribution and transport, material from nuclear stock, propagation stock and certified stock is to be kept apart from other plant material.

§ 13 Distribution and transport

Plants intended for further commercial cultivation shall be delivered in new or clean packaging. The distribution and transport of this material must be performed in such a way as to prevent contamination from pests.

§ 14 Labelling and documentation requirements

Plants intended for planting shall on sale be labelled in accordance with requirements specified in Annex 8. The information specified on the label should also be contained in the sales documentation or follow these right up until the final retail link.

Plants intended for planting of varieties which have been produced by means of genetical modification, shall be labelled “Genetically modified”.

§ 15 Suspicions of non-conformance

If it is suspected that a consignment of plants intended for planting does not fulfil the specified requirements, the consignment may not be sold before the results of necessary examinations are available.

V. Special provisions concerning import

§ 16 Import prohibitions

It is forbidden to import into Norway:

a regulated pests mentioned in Annex 1

b plants and other regulated articles mentioned in Annex 2, if these have been infested by pests mentioned in the Annex, as well as mentioned regulated pests in an isolated state

c plants and other regulated articles mentioned in Annex 3, if these originate in areas mentioned in the Annex.

The importation of genetically modified plants and parts of plants is only permitted if they have been approved in Norway in accordance with the Act relating to the production and use of genetically modified organims.

§ 17 Conditions of import

Plants and other regulated articles mentioned in Annex 4A may only be imported if these fulfil the requirements in the Annex. In addition, consignments of plants intended for planting shall be practically free of other pests.

It is not permitted to use plants and parts of plants for planting when it has been stated on import that the plant material shall be used for a different purpose.

When used agricultural machinery and used empty packaging intended to be used for plants are imported, an official statement must accompany the consignment stating that they have been thoroughly cleaned and also disinfected if necessary and that they are free from soil, plant remains and contamination from pests. The country of export's plant inspection service, or an equivalent official agricultural authority, shall issue this certification.

§ 18 Packaging

The use of grass, hay and straw as packaging for plants and parts of plants on import is not permitted.

Used packaging, which could pose a risk for spreading pests, shall be thoroughly cleaned and disinfected if necessary.

§ 19 Consignments requiring phytosanitary certification

Consignments containing plants and other regulated articles mentioned in Annex 5 shall on import be accompanied by a phytosanitary certificate in original or, on re-export, a certificate for re-export in original.

The import of up to 25 small packages (of maximum 30 g) of seeds, as well as small amounts of plants and parts of plants mentioned in Annex 9 is exempt from certification when brought in by travellers as hand luggage or as removal load. The import of up to 25 small packages (of maximum 30 g) of seeds by mail is also exempt from certification. Plants and parts of plants imported under this provision can only be brought in for personal use and are not permitted to be used for commercial purposes.

§ 20 Requirements concerning phytosanitary certificates and certificates for re-export

The certificate shall be issued by the country of export's official plant inspection service, which, on the basis of appropriate official examinations, have found that the goods covered by the certificate are free of regulated pests in accordance with Annexes 1 and 2, satisfy the requirements laid down in Annex 4 A and otherwise conform with the applicable import conditions. A certificate shall not be issued earlier than 14 days before shipping.

The certificate shall be in accordance with the International Plant Protection Convention (IPPC) model and shall be written in and completed in Norwegian, Swedish, Danish or English. The certificate shall be completed in full, either typed or written in block capitals and shall be stamped and signed by the country of export's plant inspection services. Corrections must not be made to the form unless these have clearly been made by the country in question's plant inspection service. The plants' botanical names, the consignment's contents and the quantity shall be specified in the certificate or in an attached, signed supplement.

If the consignment in the country of export has undergone disinfection or different chemical treatment in connection with the export or its preparation, this shall be stated in the certificate.

Copies of original certificates shall be clearly marked 'copy'.

When the country of export is not the plants' or the parts of plants' country of origin, a re-export certificate, issued by the official plant inspection service of the last country of export (the country of re-export), shall accompany each consignment. Conditions for the issue of a re-export certificate are that the country of re-export's import regulations for the item in question comply with the Norwegian import regulations for the item. The re-export certificate shall also certify that nothing happened to the consignment during storage in the country of export that would contravene the requirements of the applicable Norwegian import regulations. A certified copy of the original phytosanitary certificate from the country of origin shall accompany the re-export certificate and any previous re-export certificates endorsed by the plant inspection services in the country of re-export. Requirements regarding the procedure, choice of language in and the completion of forms are the same as for an ordinary phytosanitary certificate.

Fruit and vegetables which are covered by Annex 5, points 5.1, 5.2, 5.3, 6.1 and 6.2, and wood which conforms with Annex 4A only requiring debarking, are allowed to be imported as well on provision that the consignment is accompanied by the original copy of a phytosanitary certificate, which has been issued in the country of re-export and whose country of origin is stated in the certificate.

§ 21 Points of entry

Plants and parts of plants mentioned in Annex 5, points 1, 2, 4.2, 4.3 and 7, shall be imported at points of entry where the Norwegian Agricultural Inspection Service have offices. The Norwegian Agricultural Inspection Service has, when these regulations came into force, offices at the following locations:

a Oslo (Oslo regional customs office and the Gardermoen division of the customs procedures department)
b Tønsberg (Tønsberg customs office)
c Kristiansand (Kristiansand regional customs office)
d Stavanger (Stavanger regional customs office)
e Bergen (Bergen regional customs office)
f Stjørdal (Trondheim regional customs office)
g Bodø (Bodø regional customs office)
h Tromsø (Tromsø regional customs office)
i Vadsø (Vadsø customs office).

Goods can also be imported at other points of entry by arrangement. The Norwegian Agricultural Inspection Service may claim reimbursement for any expenses incurred in connection with controls being carried out at other points of entry. Consignments requiring phytosanitary certificates may be permitted to pass the border customs station without showing the certificate, on condition that the certificate is shown at the place of destination. In such cases, the Norwegian Agricultural Inspection Service may require the consignment to be sealed.

§ 22 Transit

The transit of consignments requiring phytosanitary certification through Norway shall be carried out in sealed railway trucks, sealed TIR-approved vehicles or sealed containers. If sealing is unable to be carried out, the transit may only take place once the Norwegian Agricultural Inspection Service has granted permission. Consignments in transit are not allowed to be stored in customs storage facilities or free zones.

§ 23 Notification of import

The import of potatoes shall be reported to the Norwegian Agricultural Inspection Service's office in the district in which the consignment is to arrive. Notification shall be supplied on regulation forms and shall be received two working days before the consignment is to arrive at the latest.

The Norwegian Agricultural Inspection Service may also require importers to notify the import of other goods covered by these regulations.

§ 24 Control on import

Controls to ensure that the import conditions laid down in these regulations are upheld are the responsibility of the Norwegian Agricultural Inspection Service and the Customs and Excise Administration. The import of plants and other regulated articles, which are mentioned in Annex 5, may not be unloaded before the Norwegian Agricultural Inspection Service and Customs and Excise Administration have released the consignment.

The Norwegian Agricultural Inspection Service may require that the Customs and Excise Administration withhold a consignment so that an inspection of the goods may be performed. Furthermore, the Norwegian Agricultural Inspection Service may also demand out of the same considerations that a consignment that has been handed over is retained at the importer's storage premises. If the Norwegian Agricultural Inspection Service suspects the presence of regulated pests, it may retain a consignment with no compensation until final identification is available.

The importer or the company involved's representative shall bring the goods to and from the location deemed best by the Norwegian Agricultural Inspection Service for carrying out a satisfactory control. The importer or the company involved's representative shall furthermore ensure the presence of any assistance necessary to help carry out the control.

§ 25 Documentation of import

The importer of plants and other regulated articles requiring phytosanitary certification is obliged to keep the original or copies of all phytosanitary certificates and re-export certificates for three years. The documentation shall be available to the Norwegian Agricultural Inspection Service.

§ 26 Consignments failing to fulfil the requirements

Consignments, which do not fulfil the requirements in these regulations, shall be intercepted at the point of entry. The Norwegian Agricultural Inspection Service decides in each individual case what is to be done with consignments which do not satisfy the import requirements. Consignments refused entry can be ordered destroyed or returned.

If certification requirements have not been satisfactorily fulfilled, or the consignment's identification cannot be ascertained on the basis of the certificate or other documents, the Norwegian Agricultural Inspection Service can grant the importer the opportunity to acquire the necessary documentation. This is only the case if there is no danger of regulated pests spreading by allowing the consignment to stay at the place of import. If satisfactory documentation is not produced within a given deadline, the consignment can be refused entry.

If part of a consignment has been infested by a regulated pest mentioned in Annex 1 or 2, the part of the consignment satisfying the requirements of the regulations may be permitted entry if the consignment can be split without any risk of spreading pests.

VI. Special provisions concerning export

§ 27 Notification of export

Those wishing to export consignments which require the issue of a phytosanitary certificate or re-export certificate, shall provide written notification of this to the Norwegian Agricultural Inspection Service in the district in question. Notification shall be given on a regulation form and arrive two working days at the latest before the consignment is to be controlled.

§ 28 Issue of phytosanitary certificates and certificates for re-export

The Norwegian Agricultural Inspection Service issues phytosanitary certificates or re-export certificates for consignments to countries which require the consignments to be accompanied by such certificates. The issuing of a certificate presupposes that the Norwegian Agricultural Inspection Service, on the basis of controls and inspections, has found that the consignment satisfies the recipient country's phytosanitary requirements, and that the general phytosanitary condition of the plant material is good. Furthermore, it is also a precondition that the packaging and means of transport used satisfies the recipient country's import conditions.

The Norwegian Agricultural Inspection Service may require that the exporter or the company involved's representative transports the consignment to and from the location deemed best to carry out the necessary controls by the Norwegian Agricultural Inspection Service. The exporter or the company involved's representative shall also ensure any necessary assistance during the control.

§ 29 Inspection during cultivation

Inspection during cultivation, or other examinations of the cultivation fields, shall be carried out if required by the country of import. The exporter is under obligation to see that such an inspection or examinations are carried out. Requests for inspections to be carried out during cultivation must be made early enough for these to be satisfactorily carried out. The exporter shall make preparations so that the inspection can be carried out as thoroughly and quickly as possible, and also see to there being enough staff to help. Requests for controls can be refused if a satisfactory inspection is unable to be carried out or if the information supplied is deficient or erroneous.

VII. Fees, etc.

§ 30 Basic fee

Businesses, which are to be registered in compliance with section 7, shall pay an annual fee of NOK 500.

§ 31 Control fees regarding production and sale at businesses required to register

When the Norwegian Agricultural Inspection Service, in addition to regular audits of the businesses' internal controls, has to carry out a control of plants intended for planting or controls of imposed monitoring orders, the following charges apply: Call-out NOK 500 per visit, as well as NOK 250 per hour of effective control time, rounded to the closer half-hour.

§ 32 Control fee on importation

A fee set at 1.8% of the customs value is paid to cover expenses in connection with the phytosanitary control of types of goods specified in Annex 5. However, there is a minimum charge of NOK 50. The fee is paid to the Customs and Excise Administration and is billed according to the same regulations as for customs duty.

The Norwegian Agricultural Inspection Service may, at the request of the importer, carry out controls of used agricultural machinery and empty packaging intended to be used for plants and which does not fulfil the certification requirements mentioned in section 17. For this control, a fee of NOK 300 is charged per machine or per consignment of packaging, as well as expenses incurred travelling to and from the control location and per diem expenses at national rates.

§ 33 Fees for issuing phytosanitary certificates or certificates for re-export

A fee of NOK 250 is charged per phytosanitary or re-export certificate.

For goods which have not been controlled during production and processing, a charge for call-out and control time is also made, cf. section 31. No call-out charge is billed for goods when these can be controlled at one of the Norwegian Agricultural Inspection Service's offices.

§ 34 Analyses

Costs incurred by the analyses of samples taken by the Norwegian Agricultural Inspection Service at ordinary supervisory visits are normally covered by the basic fee or call-out charge. Exceptions are analyses in the case of extended sample taking at businesses with inadequate internal controls. For these sorts of analysis, the business will pay in accordance with the current, valid price list of the Planteforsk Planteklinikk, or other laboratories.

§ 35 Exemptions

The Norwegian Agricultural Inspection Service can decide that a fee be dropped or reduced for controls carried out at businesses which, in accordance with section 5, are subject to particularly frequent controls.

The Norwegian Agricultural Inspection Service may also decide that a charge or fee may be dropped or reduced for businesses that have other control systems approved by the Norwegian Agricultural Inspection Service.

VIII. Other common provisions

§ 36 Inspection and access to carry out controls

The Norwegian Agricultural Inspection Service carries out inspections in order for the provisions in these regulations to be upheld.

When carrying out these inspections, the Norwegian Agricultural Inspection Service, or the person(s) under its authorisation, is granted access to carry out controls of the production of plants and parts of plants, as well as controls of other places where regulated pests can occur. These sorts of controls may be carried out in order to:

a gather more detailed information in situations where the presence of regulated pests mentioned in Annexes 1, 2 and 6 is suspected
b carry out inspections so that set measures in accordance with section 6 are followed
c monitor or map possible spreads of regulated pests
d carry out inspections so that provisions concerning internal controls are complied with

e carry out inspections so that requirements laid down in sections 4 - 5 and 10 - 15 are fulfilled during production and sale
f carry out inspections so that import conditions are complied with
g carry out inspections so that export conditions are complied with.

The Norwegian Agricultural Inspection Service has access to retrieving information about businesses covered by the regulations if this information is necessary in order to carry out an effective control.

The Norwegian Agricultural Inspection Service has full authority to authorise other institutions or persons to carry out tasks conveyed in these regulations.

Local municipal and regional agricultural administrations shall assist the Norwegian Agricultural Inspection Service in controls in accordance with the above-mentioned points a and b.

§ 37 Taking samples

In connection with controls in accordance with section 36, the Norwegian Agricultural Inspection Service is permitted, free of charge, to extract necessary samples for further examination in exchange for a receipt.

§ 38 Obligation to report regulated pests

The owner or user of a property, who has knowledge of or suspects that there are regulated pests mentioned in Annex 1 or 2 on the property, are under obligation to report this immediately to the Norwegian Agricultural Inspection Service, county governor or local authority. If an occurrence is reported to the county governor or local authority, notification must be passed on to the Norwegian Agricultural Inspection Service without delay.

§ 39 Obligation to inform

The owner or transferee of the property is obliged, in the event of the property being sold, leased or rented out, to inform the other party of any restrictions laid on the property which are pursuant to these regulations. This kind of information shall be supplied before an arrangement is entered into.

Restrictions of a period of five years or more, which are pursuant to these regulations, shall be registered on the property. The owner of the property covers registration costs.

§ 40 Other pests

If the Norwegian Agricultural Inspection Service considers that there is a particularly high phytosanitary risk, the Norwegian Agricultural Inspection Service can implement interim measures to prevent the introduction, and eradicate or impede the spread of other serious hazardous pests than those mentioned in Annexes 1, 2 and 6.

Section 6 applies correspondingly.

§ 41 Dispensations

The Norwegian Agricultural Inspection Service may in extenuating cases grant dispensations from the provisions in these regulations.

IX. Penalties and sanctions

§ 42 Enforced fines

To ensure that orders given in accordance with these regulations are followed up, the Norwegian Agricultural Inspection Service can exact penalty fines. An enforced fine is imposed if the person responsible does not carry out the order by the deadline set for compliance, and will continue for as long as the unlawful condition persists. An enforced fine constitutes grounds for enforcing levy execution.

§ 43 Carrying out orders

If the owner or user neglects to carry out orders given in accordance with these regulations, the Norwegian Agricultural Inspection Service may, after special notification, have the work carried out at the owner's or user's own expense. Demands for reimbursement of expenses incurred are grounds for enforcing levy execution.

§ 44 Withdrawal of registration

The Norwegian Agricultural Inspection Service may withdraw a registration if the business does not discharge its obligations.

§ 45 Penalties

Anyone contravening these regulations, or provisions pursuant to these regulations, will be liable to a fine unless more serious penalties are pertinent in accordance with Norwegian civil and penal law.

X. Closing provisions

§ 46 In force

These regulations enter into force on 1 January 2001 unless other consequences occur as a result of section 47.

From the same date, the following are repealed:

a Regulations relating to measures against hazardous plant diseases and regulated pests, of 12.12.96
b Regulations relating to the import of plants and parts of plants, etc., to Norway, of 10.09.98
c Regulations relating to the control and issue of certificates in association with the export of plants and plant products, etc., from Norway, of 17.06.88
d Regulations relating to government-controlled production and sale of seed commodities, plants and parts of plants, of 1 January 1981.
e Regulations relating to the sale of nursery plants, by royal decree, of 11 May 1973,
f Regulations relating to control fees in accordance with the Act on measures against plant disease and plant pests, of 19.07.83.
g all other supplementary regulations and provisions pursuant to these regulations.

§ 47 Interim arrangements

Sections 7 and 8 relating to registration obligation and section 44 relating to registration withdrawal will not come into force until 1 July 2001.

Section 9 relating to the introduction of internal control and section 14 relating to labelling and documentation will not come into force until 1 January 2002. At the same time, the regulations relating to the sorting, packaging and labelling of nursery stock, of 25 March 1988 are repealed.

Annex 1

Pests which are prohibited to introduce and spread in Norway

No.	Name	Synonym
INSECTS, MITES, NEMATODES		
1	*Acleris gloverana* (Walsingham)	
2	*Acleris variana* (Fernald)	
3	*Amauromyza maculosa* (Malloch)	
4	*Bemisia tabaci* (Gennadius) (non-European populations)	
5	*Blitopertha orientalis* (Waterhouse)	*Anomala orientalis* (Waterhouse)
6	*Cacoecimorpha pronubana* Hübner	
7	*Conotrachelus nenuphar* (Herbst)	
8	*Epichoristodes acerbella* Walker	
9	*Globodera pallida* (Stone) Behrens	
10	*Globodera rostochiensis* (Wollenweber) Behrens	
11	*Helicoverpa armigera* (Hübner)	*Heliothis armigera* Hübner
12	*Leptinotarsa decemlineata* Say	
13	*Liriomyza huidobrensis* (Blanchard)	
14	*Liriomyza sativae* Blanchard	
15	*Liriomyza trifolii* (Burgess)	
16	*Meloidogyne chitwoodii* Golden et.al.	
17	*Meloidogyne fallax* Karssen	
18	*Monochamus* spp. (non-European species)	
19	*Nacobbus aberrans* (Thorne) Thorne & Allen	
20	*Opogona sacchari* (Bojer)	
21	*Popillia japonica* Newman	
22	*Premnotrypes* spp. (non-European varieties)	
23	*Spodoptera littoralis* (Boisduval)	
24	*Spodoptera litura* (Fabricius)	
25	Tephritidae – non-European species such as: a) *Rhagoletis cingulata* (Loew) b) *Rhagoletis fausta* (Osten-Sacken) c) *Rhagoletis indifferens* Curran d) *Rhagoletis mendax* Curran e) *Rhagoletis pomonella* (Walsh)	
26	*Thrips palmi* Karny	
27	*Xiphinema americanum* Cobb sensu lato (non-European populations)	
28	*Xiphinema californicum* Lamberti & Bleve-Zacheo	
FLATWORM		
1	*Arthurdendendyus triangulatus*	*Artioposthia triangulata* (Dendy)
FUNGI		
1	*Botryosphaeria laricina* (K. Sawada) Y. Zhong	*Guignardia laricina* (Saw.) Yamamoto & Ito
2	*Ceratocystis fagacearum* (Bretz) Hunt	
3	*Chrysomyxa arctostaphyli* Dietel	
4	*Cronartium* spp. (non-European species)	
5	*Endocronartium* spp. (non-European species)	
6	*Gymnosporangium* spp. (non-European	

	species)	
7	*Melampsora farlowii* (J.C. Arthur) J.J. Davis	
8	*Melampsora medusae* Thümen	
9	*Monilinia fructicola* (Winter) Honey	
10	*Mycosphaerella laricis-leptolepidis* K. Ito, K. Sato & M. Ota	
11	*Mycosphaerella populorum* G. E. Thompson	
12	*Ophiostoma wageneri* (Goheen & Cobb) Harrington	*Ceratocystis wagenerei* Goheen & Cobb
13	*Phellinus weirii* (Murrill) R.L. Gilbertson	*Inonotus weirii* (Murrill) Kotlaba & Pouzar
14	*Phoma andina* Turkensteen	
15	*Phyllosticta solitaria* Ellis & Everhart	
16	*Phytophthora fragariae* Hickman var. *fragariae* Wilcox & Duncan	
17	*Septoria lycopersici* Spegazzini var. *malagutii* Ciccarone & Boerema	
18	*Synchytrium endobioticum* (Schilbersky) Percival	
19	*Thecaphora solani* (Thirumulachar & O'Brien) Mordue	*Angiosorus solani* Thirumulachar & O'Brien
20	*Tilletia indica* Mitra	
BACTERIA		
1	Apple proliferation phytoplasma	Apple proliferation mycoplasm
2	*Clavibacter michiganensis* subsp. *sepedonicus* (Spieckermann & Kotthoff) Davis et al.	*Corynebacterium sepedonicum*
3	Elm phloem necrosis phytoplasma	Elm phloem necrosis mycoplasm
4	Peach X-disease phytoplasma	Peach X-disease mycoplasm
5	Pear decline phytoplasma	Pear decline mycoplasm
6	*Ralstonia solanacearum* (Smith) Yabuuchi et al.	*Pseudomonas solanacearum* (Smith) Smith
7	Strawberry witches' broom phytoplasma	Strawberry witches' broom mycoplasm
VIRUSES		
1	Blueberry leaf mottle nepovirus	
2	Non-European viruses and virus-like organisms on *Fragaria* L., *Malus* Mill., *Prunus* L., *Pyrus* L., *Ribes* L., *Rubus* L., such as: a) Cherry rasp leaf 'nepovirus' b) Peach mosaic virus (American) c) Plum American line pattern ilavirus d) Raspberry leaf curl luteovirus e) Strawberry latent C 'rhabdovirus' f) Strawberry veinbanding caulimovirus	
3	Impatiens necrotic spot tospovirus	
4	Potato spindle tuber viroid	
5	Potato viruses not known to occur in Europe, such as: a) Potato Andean latent tymovirus b) Potato Andean mottle comovirus c) Arracacha B 'nepovirus', oca strain d) Potato black ringspot nepovirus e) Potato T trichovirus f) Non-European isolates of potato viruses A; M; S; V; X and Y (including Yo, Yn, Yc) and potato leaf roll polerovirus	
6	Tobacco ringspot nepovirus	
7	Tomato ringspot nepovirus	
8	Tomato spotted wilt tospovirus	

Annex 2

Pests which are prohibited to introduce and spread in Norway if these are present in certain plants and other regulated articles

No.	Name	Synonym	Plants and other regulated articles
INSECTS, MITES, NEMATODES			
1	*Aculops fuchsiae* Keifer		Plants intended for planting (other than seeds)of *Fuchsia* L.
2	*Bursaphelenchus xylophilus* (Steiner & Bührer) Nickle		Plants (other than fruit and seeds) and wood of *Coniferales*, including wood which has not kept its natural rounded surface
3	*Cydia prunivora* (Walsh)	*Enarmonia prunivora* Walsh	Plants intended for planting (other than seeds) of *Crataegus* L., *Malus* Mill., *Photinia* Lindl., *Prunus* L. and *Rosa* L. and fruit of *Malus* Mill. and *Prunus* L.
4	*Ditylenchus destructor* Thorne		Flower bulbs and corms intended for planting of *Crocus* L., miniature cultivars and their hybrids of the genera *Gladiolus* L., such as *Gladiolus callianthus* Marais, *Gladiolus colvillei* Sweet, *Gladiolus nanus* hort., *Gladiolus ramosus* hort., *Gladiolus tubergenii* hort., *Hyacinthus* L., Iris L., *Tigridia* Juss., *Tulipa* L., and tubers intended for planting of *Solanum tubersosum* L.
5	*Ditylenchus dipsaci* (Kühn) Filipjev		Seeds and bulbs intended for planting of *Allium cepa* L. var. *ascalonicum* Backer, *Allium cepa* L. var. *cepa* and *Allium schoenoprasum* L., plants intended for planting of *Allium porrum* L., flower bulbs and tubers intended for planting of *Camassia* Lindl., *Chionodoxa* Boiss., *Crocus flavus* West. 'Golden Yellow', Galanthus L., *Galtonia candicans* (Bak.) Decne, *Hyacinthus* L. Ismene Herbert, *Muscari* Miller, *Narcissus* L., *Ornithogalum* L., *Puschkinia* Adams, *Scilla* L. and *Tulipa* L.
6	*Eriosoma lanigerum*		Plants intended for planting (other than seeds) of *Amelanchier* Medik., *Choenomeles* Lindl., *Cotoneaster* Medik., *Crataegus* L., *Cydonia* Mill., *Malus* Mill., *Pyracantha* M.J. Roem., *Pyrus* L., *Sorbus* L. and *Ulmus* L.
7	*Pissodes* spp. (non-European species)		Plants (other than fruit and seeds), wood with bark and isolated bark of *Coniferales*, originating in non-European countries.
8	*Quadraspidiotus perniciosus* (Comstock)		Plants intended for planting (other than seeds) of *Acacia* Mill., *Acer* L., *Amelanchier* Medik., *Betula* L., *Cercidiphyllum* Sieb et Zucc., *Choenomeles* Lindl., *Cornus* L., *Cotoneaster* Medik., *Crataegus* L., *Cydonia* Mill., *Eriobotrya* Lindl., *Euonymus* L., *Fagus* L., *Juglans* L., *Ligustrum* L., *Lonicera* L., *Malus* Mill., *Mespilus* L., *Maclura* Nutt., *Populus* L., *Prunus* L., *Ptelea* L., *Pyracantha* M.J. Roem., *Pyrus* L., *Ribes* L., *Rosa* L., *Salix* L., *Sorbus* L., *Spiraea* L., *Symphoricarpos* Duham., *Syringa* L., *Tilia* L. and *Ulmus* L., *Vitis* L
9	*Radopholus similis* (Cobb) Thorne		Plants intended for planting, rooted or with growing medium attached or associated, of *Araceae*, *Marantaceae*, *Persea* spp., *Strelitziaceae*

10	*Scolytidae* spp. (non-European species)		Plants (other than fruit and seeds), wood with bark and isolated bark of *Coniferales*, originating in non-European countries.
FUNGI			
1	*Alternaria mali* Roberts	*A. alternata* (non-European pathogenic isolate)	Plants intended for planting of *Cydonia* Mill., *Malus* Mill. and *Pyrus* L
2	*Apiosporina morbosa* (Schweinitz) von Arx	*Dibotryon morbosum*	Plants intended for planting (other than seeds)of *Prunus* L.
3	*Atropellis* spp.		Plants (other than fruit and seeds), isolated bark and wood of *Pinus* L.
4	*Colletotrichum acutatum* Simmonds		Plants intended for planting (other than seeds)of *Fragaria* L.
5	*Cryphonectria parasitica* (Murrill) Barr	*Endothia parasitica*	Plants intended for planting (other than seeds) of *Castanea* Mill. and *Quercus* L and wood and isolated bark of *Castanea* Mill.
6	*Diaporthe vaccinii* Shear		Plants intended for planting (other than seeds of *Vaccinium* spp.).
7	*Mycosphaerella dearnessii* M.E. Barr	*Scirrhia acicola* (Dearn.) Siggers	Plants (other than fruit and seeds) of *Pinus* L
8	*Mycosphaerella gibsonii* H.C. Evans	*Cercoseptoria pini-densiflorae* (Hori et Nambu) Deighton *Cercospora pini-densiflorae*	Plants (other than fruit and seeds) and wood of *Pinus* L.
9	*Mycosphaerella pini* E. Rostrup	*Scirrhia pini* Funk et Parker	Plants intended for planting (other than seeds)of *Pinus* L.
10	*Phialophora cinerescens* (Wollenweber) van Beyma		Plants intended for planting (other than seeds) of *Dianthus* L.
11	*Phytophthora fragariae* Hickman var. *rubi* Wilcox & Duncan		Plants intended for planting (other than seeds)of *Rubus* L.
12	*Puccinia horiana* P. Hennings		Plants intended for planting (other than seeds)of *Dendranthema* (DC.) Des Moul.
13	*Puccinia pelargonii-zonalis* Doidge		Plants intended for planting (other than seeds) of *Pelargonium* L'HÈrit. ex Ait.
14	*Puccinia pittieriana* P. Hennings		Plants intended for planting (other than fruit and seeds)of *Solanaceae*
15	*Sclerotium cepivorum* Berk.		Plants intended for planting (other than seeds) of *Allium* L
BACTERIA			
1	*Burkholderia caryophylli* (Burkholder) Yabuuchi et al.	*Pseudomomas caryophylli* (Burkholder) Starr & Burkholder	Plants intended for planting (other than seeds)of *Dianthus* L.
2	*Clavibacter michiganensis* subsp. *michiganensis* (Smith) Davis et al.	*Corynebacterium michiganense*	Plants intended for planting of *Lycopersicon esculentum* Mill.
3	*Erwinia amylovora* (Burrill) Winslow et al.		Plants (other than seeds) and live pollen for pollination of *Amelanchier* Medik., *Choenomeles* Lindl., *Cotoneaster* Medik., *Crataegus* L., X *Crataemespilus* E.G. Camus, *Cydonia* Mill., *Eriobotrya* Lindl., *Malus* Mill., *Mespilus* L., *Photinia* Lindl., *Pyracantha* M.J.Roem., *Pyrus* L.,

			Sorbus L. (other than *Sorbus intermedia* (Ehrh.) Pers.) and *Stranvaesia* Lindl.
4	*Erwinia chrysanthemi* Burkholder et al. pv. *chrysanthemi* and pv. *dianthicola*		Plants intended for planting (other than seeds) of *Dianthus* L. and *Dendranthema* (DC.) Des Moul.
5	Potato stolbur phytoplasma	Stolbur (MLO) in *Solanaceae*	Plants intended for planting (other than seeds)of *Solanaceae*.
6	*Xanthomonas arboricola* pv. *pruni* (Smith) Vauterin et al.	*Xanthomonas campestris* pv. *pruni* (Smith) Dye	Plants intended for planting (other than seeds)of *Prunus* L.
7	*Xanthomonas axonopodis* pv. *dieffenbachiae* (McCulloch &Pirone) Vauterin et al.		Plants intended for planting (other than seeds) of *Araceae*
8	*Xanthomonas fragariae* Kennedy & King		Plants intended for planting (other than seeds)of *Fragaria* L.
9	*Xanthomonas vesicatoria* (ex Doidge) Vauterin et al.	*Xanthomonas campestris* pv. *vesicatoria* (Doidge) Dye	Plants intended for planting of *Capsicum* L. and *Lycopersicon esculentum* Mill.
VIRUSES			
1	Apple mosaic ilavirus (in *Rubus*)	Prunus necrotic ringspot virus	Plants intended for planting of *Rubus* L.
2	Arabis mosaic nepovirus		Plants intended for planting (other than seeds)of *Fragaria* L. and *Rubus* L.
3	Black raspberry latent virus		Plants intended for planting of *Rubus* L.
4	Cherry leaf roll virus nepovirus		Plants intended for planting of *Rubus* L.
6	Chrysanthemum stunt viroid		Plants intended for planting (other than seeds) of *Dendranthema* (DC.) Des Moul.
7	Plum pox potyvirus		Plants intended for planting (other than seeds) of *Prunus* L.
8	Potato leaf roll polerovirus (European isolates)		Plants intended for planting of *Solanum tuberosum* L., originating in European countries
9	Raspberry ringspot nepovirus		Plants intended for planting (other than seeds)of *Fragaria* L. and *Rubus* L.
10	Strawberry crinkle cytorhabdovirus		Plants intended for planting (other than seeds) of *Fragaria* L.
11	Strawberry latent ringspot nepovirus		Plants intended for planting (other than seeds)of *Fragaria* L. and *Rubus* L.
12	Strawberry mild yellow edge disease	Strawberry mild yellow edge disease	Plants intended for planting (other than seeds)of *Fragaria* L.
13	Tomato black ring nepovirus		Plants intended for planting (other than seeds) of *Fragaria* L. and *Rubus* L.

Annex 3

Plants and other regulated articles which are prohibited to import if they originate in the following areas

No.	Plants and other regulated articles		Area of origin
1.1	*Coniferales*	Plants (other than seeds and fruit), wood with bark and chips of wood with bark, isolated bark and wood waste	Non-European countries and Portugal
1.2	*Coniferales*	All chips	Canada, China, Japan, Korea, Mexico, Portugal, Taiwan and the USA
2	*Castanea* Mill. *Quercus* L.	Plants (other than seeds and fruit), isolated bark (other than bark from *Quercus suber* L.) and wood waste	Non-European countries
3	*Populus* L.	Plants (other than seeds and fruit), isolated bark and wood waste	Countries on the American continent
4	*Prunus* L.	Plants (other than seeds and fruit)	Non-European countries
5	*Ulmus* L.	Plants intended for planting	North America
6.1	*Amelanchier* Medik. *Choenomeles* Lindl. *Cotoneaster* Medik. *Crataegus* L. X *Crataemespilus* E.G. Camus *Cydonia* Mill. *Eriobotrya* Lindl. *Malus* Mill. *Mespilus* L. *Photinia* Lindl. *Pyracantha* M.J. Roem. *Pyrus* L. *Sorbus* L. (other than *Sorbus intermedia* (Ehrh.) Pers. *Stranvaesia* Lindl.	Plants (other than seeds and fruit), but including live pollen for pollination	Countries where *Erwinia amylovora* (Burrill) Winslow et al. is known to occur
6.2	*Cotoneaster bullatus* Bois *Cotoneaster salicifolius* Franch. *Cotoneaster* Wateri hybrids	Plants intended for planting	All countries
7	*Fragaria* L.	Plants intended for planting (other than seeds)	All countries
8	*Solanum tuberosum* L. and other species of *Solanum* L., which form stolons or tubers	Plants intended for planting (other than seeds)	All countries
9	*Solanaceae*, all species other than those mentioned in 8	Plants intended for planting (other than seeds)	Non-European countries (other than the Mediterranean countries)
10		Soil and organic growing media, other than growing media that are composed entirely of peat	Non-European countries

Annex 4A

Specific requirements for the import of certain plants and other regulated articles

No.	Plants and other regulated articles	Specific requirements
1.1	Wood of *Coniferales,* other than wood in the form of chips, packaging, dunnage and pallets, but including wood which has not kept its natural, rounded surface, originating from Canada, China, Japan, Korea, Mexico, Portugal, Taiwan and the USA	Without prejudice to the provisions applicable to Annex 3, point 1.1: a) The wood shall be squared so that all its natural rounded surface is removed, and b) by means of an approved indicator system marked on the wood, they are certified to have undergone adequate heat treatment, reaching a core temperature of at least 56°C for a period of 30 minutes.
1.2	Wood of *Coniferales*, in the form of chips, packaging, dunnage and pallets, but including wood which has not kept its natural, rounded surface, originating from Canada, China, Japan, Korea, Mexico, Portugal, Taiwan and the USA	a) The wood shall be stripped of its bark and be free from grub holes caused by the genus *Monochamus* (non-European spp.), and a) the wood shall have a moisture content expressed as a percentage of dry matter of less than 20%, achieved at the time of manufacture.
1.3	Wood of *Coniferales*, other than wood in the form of chips and shavings, which are obtained in whole or part from conifers, but including wood which has not kept its natural, rounded surface, originating from non-European countries other than Canada, China, Japan, Korea, Mexico, Taiwan and the USA	a) The wood shall be stripped of its bark and free from grub holes caused by the genus *Monochamus* (non-European spp.), or b) there shall be evidence by a mark 'Kiln-dried', or 'KD' or another internationally-recognised mark, put on the wood or on its packaging in accordance with current commercial usage, that it has undergone kiln-drying to below 20% moisture content, expressed as a percentage of dry matter, at time of manufacture, achieved through an appropriate time/temperature schedule.
2	Wood of *Castanea* Mill. and *Quercus* L., including wood that has not kept its natural rounded surface, originating from countries in North America.	Without prejudice to the provisions applicable to Annex 3, point 2: The wood shall be stripped of its bark and a) either be squared so as to remove the rounded surface entirely, or b) there is an official statement that the moisture content of the wood does not exceed 20%, expressed as a percentage of the dry matter,

		or c) there is an official statement that the wood has been disinfected using an appropriate hot-air or hot-water treatment, or d) in the case of sawn wood, with or without residual bark attached: there shall be evidence by a mark 'Kiln-dried', 'KD' or another internationally-recognised mark, put on the wood or on its packaging in accordance with current commercial usage, that it has undergone kiln-drying to below 20% moisture content, expressed as a percentage of dry matter, at time of manufacture, achieved through an appropriate time/temperature schedule.
3	Wood of *Castanea* Mill.	Without prejudice to the provisions and requirements applicable to Annex 3, point 2 and Annex 4A, point 2: a) there is an official statement that the wood originates in areas known to be free from *Cryphonectria parasitica* (Murrill) Barr., or b) the wood shall be stripped of its bark.
4	Wood of *Populus* L. originating from countries on the American continent	Without prejudice to the provisions applicable to Annex 3, point 3: The wood shall be stripped of its bark.
5	Wood in the form of chips which is derived in whole or part from - *Castanea* Mill., *Populus* L. and *Quercus* L., originating from non-European countries, or - *Coniferales*, originating from non-European countries other than Canada, China, Japan, Korea, Taiwan and the USA	Without prejudice to the provisions and requirements applicable to Annex 3, points 1.1,1.2, 2 and 3 and Annex 4A, points 2, 3 and 4: There is an official statement that the goods a) have been manufactured exclusively from wood that has been stripped of its bark, or b) have been manufactured exclusively from wood which has undergone kiln-drying to below 20% moisture content, expressed as a percentage of dry matter, at the time of manufacture, achieved through an appropriate time/temperature schedule, or c) have undergone fumigation shipboard or in a container prior to shipment, and shall be shipped in sealed containers or in such a way as to prevent any re-infestation.
6	Plants intended for planting (other than seeds) of *Pinus* L.	Without prejudice to the provisions applicable to Annex 3, point 1.1:

		There is an official statement that no symptoms of *Mycosphaerella dearnessii* M. E. Barr or *Mycosphaerella pini* E. Rostrup have been observed at the place of production or in its immediate vicinity since the beginning of the last complete cycle of vegetation.
7	Plants intended for planting (other than seeds) of *Abies* Mill., *Larix* Mill., *Picea* A. Dietr., *Pinus* L., *Pseudotsuga* Carr. and *Tsuga* Carr.	Without prejudice to the provisions and requirements applicable to Annex 3, point 1.1 and Annex 4A, point 6: There is an official statement that no symptoms of *Melampsora medusae* Thümen have been observed at the place of production or in its immediate vicinity since the beginning of the last complete cycle of vegetation.
8	Plants intended for planting (other than seeds) of *Castanea* Mill. and *Quercus* L.	Without prejudice to the provisions applicable to Annex 3, point 2: There is an official statement that a) the plants originate from areas known to be free of *Cryphonectria parasitica* (Murrill), or b) no symptoms of *Cryphonectria parasitica* (Murrill) have been observed at the place of production or in its immediate vicinity since the beginning of the last complete cycle of vegetation.

9	Plants intended for planting (other than seeds) of *Populus* L	Without prejudice to the provisions applicable to Annex 3, point 3: There is an official statement that no symptoms of *Melampsora medusae* Thümen have been observed at the place of production or in its immediate vicinity since the beginning of the last complete cycle of vegetation.
10	Plants intended for planting (other than seeds) of the following genera, originating in countries where *Quadraspidiotus perniciosus* is known to occur: *Acacia*, *Acer* L., *Amelanchier* Med., *Betula* L., *Cercidiphyllum* Sieb et Zucc., *Choenomeles* Lindl., *Cornus* L., *Cotoneaster* Medik., *Crataegus* L., *Cydonia* Mill., *Eriobotrya* Lindl., *Euonymus* L., *Fagus* L., *Juglans L., Ligustrum* L., *Lonicera* L., *Malus* Mill., *Mespilus* L., *Maclura* Nutt., *Populus* L., *Prunus* L., *Ptelea* L., *Pyracantha* M.J. Roem., *Pyrus* L., *Ribes* L., *Rosa* L., *Salix* L., *Sorbus* L., *Spiraea* L., *Symphoricarpos* Duham., *Syringa* L., *Tilia* L. and *Ulmus* L., *Vitis* L.	Without prejudice to the provisions and requirements applicable to Annex 3, points 3, 4, 5, 6.1, and 6.2 and Annex 4A, point 9: There is an official statement that the plants originate in an area where *Quadraspidiotus perniciosus* (Comstock) is not known to occur, and at a place of production that has been under official monitoring since the beginning of the last two cycles of vegetation, and where no signs of *Quadraspidiotus perniciosus* (Comstock) have been observed.
11	Plants intended for planting (other than seeds)of *Choenomeles* Lindl., *Crataegus* L., *Cydonia* Mill., *Eriobotrya* Lindl., *Malus* Mill., *Prunus* L. and *Pyrus* L., originating in non-European countries	Without prejudice to the provisions and requirements applicable to Annex 3, points 4 and 6.1 and Annex 4A, point 10: There is an official statement that a) the plants originate in a country known to be free from *Monilinia fructicola* (Winter) Honey, or b) the plants originate in an area recognised as being free from *Monilinia fructicola* (Winter) Honey, and that no symptoms of *Monilinia fructicola* (Winter) Honey have been observed at the place of production since the beginning of the last complete cycle of vegetation.

12	Plants intended for planting (other than seeds)of *Crataegus* L., *Malus* Mill. and *Pyrus* L, originating in countries in which *Phyllosticta solitaria* Ellis & Everhart is known to occur	Without prejudice to the provisions and requirements applicable to Annex 3, point 6.1 and Annex 4A, points 10 and 11: There is an official statement that no symptoms of *Phyllosticta solitaria* Ellis & Everhart have been observed on plants at the place of production since the beginning of the last complete cycle of vegetation.
13.1	Plants intended for planting (other than seeds) of *Malus* Mill,originating in countries in which the following pests are known to occur on *Malus* Mill.: - Cherry rasp leaf nepovirus (American - Tomato ringspot nepovirus	Without prejudice to the provisions and requirements applicable to Annex 3, point 6.1 and Annex 4A, points 10, 11 and 12: There is an official statement that a) the plants are derived in direct line from material which is maintained under appropriate conditions and subjected, within the last three complete cycles of vegetation, at least once to official testing for at least the pests in question by means of suitable indicators or equivalent methods, and were found to be free, in these tests, from these pests, and b) no symptoms of diseases caused by the pests in question have been observed at the place of production or on susceptible plants in its immediate vicinity since the beginning of the last three complete cycles of vegetation.
13.2	Plants intended for planting (other than seeds) of *Malus* Mill, originating in countries where Apple proliferation phytoplasma is known to occur	Without prejudice to the provisions and requirements applicable to Annex 3, point 6.1 and Annex 4A, points 10, 11, 12 and 13.1: There is an official statement that a) the plants originate in areas known to be free from Apple proliferation phytoplasma, or b) the plants (other than those raised from seeds) are derived in direct line from material which is maintained under appropriate conditions and subjected, within the last six complete cycles of vegetation, at least once to official testing for Apple proliferation phytoplasma, using suitable indicators or equivalent methods, and which have been found to be free, in these tests, from this pest, and no symptoms of diseases caused by Apple proliferation phytoplasma have been observed at the place of production or on susceptible plants in its immediate vicinity since the beginning of the last three complete cycles of vegetation.
14	Plants intended for planting (other than	Without prejudice to the provisions and requirements

	seeds)of *Cydonia* Mill. and *Pyrus* L, originating in countries where Pear decline phytoplasma is known to occur	applicable to Annex 3, point 6.1 and Annex 4A, points 10, 11 and 12: There is an official statement that plants at the place of production and in its immediate vicinity which have shown symptoms giving rise to the suspicion of contamination by Pear decline phytoplasma have been rogued out at that place within the last three complete cycles of vegetation.
15.1	Plants intended for planting (other than seeds) of the following species of *Prunus* L. ,originating in countries where Plum pox potyvirus is known to occur - *Prunus armeniaca* L. - *Prunus blireiana* Andre - *Prunus brigantina* Vill. - *Prunus cerasifera* Ehrh. - *Prunus cistena* Hansen - *Prunus curdica* Fenzl et Fritsch. (Zander) - *Prunus domestica* L. *domestica* (Borkh) Schneid. - *Prunus domestica* L. *insititia* (L.) C.K. Schneid. - *Prunus domestica* L. *italica* (Borkh.) Gams - *Prunus dulcis* (Mill.) D.A. Webb - *Prunus glandulosa* Thunb. ex Murr. - *Prunus holosericea* Batal - *Prunus hortulana* L.H. Bailey - *Prunus japonica* Thunb. ex Murr. - *Prunus mandshurica* (Maxim.) Koehne - *Prunus maritima* Marsh. - *Prunus mume* Sieb. et Zucc. - *Prunus nigra* Ait. - *Prunus persica* (L.) Batsch - *Prunus salicina* L - *Prunus sibirica* L - *Prunus simonii* Carr. - *Prunus spinosa* L. - *Prunus tomentosa* Thunb. ex Murr. - *Prunus triloba* Lindl. - other species of *Prunus* L. which are susceptible to Plum pox potyvirus	Without prejudice to the provisions and requirements applicable to Annex 3, point 4 and Annex 4A, points 10 and 11: There is an official statement that a) the plants, other than those raised from seeds, are derived in direct line from material which is maintained under appropriate conditions and subjected, within the last three complete cycles of vegetation, at least once to official testing for Plum pox potyvirus by means of suitable indicators or equivalent methods, and were found to be free, in these tests, from this pest, and b) no symptoms of diseases caused by Plum pox potyvirus have been observed at the place of production or on susceptible plants in its immediate vicinity since the beginning of the last three complete cycles of vegetation. and c) plants at the place of production which have shown symptoms of disease caused by other viruses or other virus-like pathogens have been rogued out.
15.2	Plants intended for planting of *Prunus* L. a) originating in countries where Tomato ringspot nepovirus is known to occur on *Prunus* L. b) other than seeds, originating in countries where the following pests are known to occur: - Cherry rasp leaf nepovirus - Peach mosaic virus (American) - Plum American line pattern ilavirus - Peach X-disease phytoplasma	Without prejudice to the provisions and requirements in Annex 3, point 4 and Annex 4A, points 10, 11 and 15.1: There is an official statement that a) the plants are derived in direct line from material which is maintained under appropriate conditions and subjected, within the last three complete cycles of vegetation, at least once to official testing for at least the pests in question by means of suitable indicators or equivalent methods, and were found to be free, in these tests, from these pests, and

		b) no symptoms of diseases caused by the relevant pests have been observed at the place of production or on susceptible plants in its immediate vicinity since the beginning of the last three complete cycles of vegetation.
15.3	Plants intended for planting (other than seeds)of *Prunus* L.,originating in countries where *Xanthomonas arboricola* pv *pruni* (Smith) Vauterin et al. is known to occur	Without prejudice to the provisions and requirements applicable to Annex 3, point 4 and Annex 4A, points 10, 11, 15.1 and 15.2: There is an official statement that no symptoms of *Xanthomonas arboricola* pv *pruni* (Smith) Vauterin et al. have been observed on plants at the place of production or on susceptible plants in its immediate vicinity since the beginning of the last complete cycle of vegetation.
16.1	Plants intended for planting (other than seeds)of *Rubus* L.	There is an official statement that a) *Phytophthora fragariae* Hickman var. *rubi* Wilcox & Duncan is not known to occur at the place of production, and b) the plants have been inspected and no symptoms of *Phytophthora fragariae* Hickman var. *rubi* Wilcox & Duncan have been observed at inspections carried out at a suitable time during the last cycle of vegetation.

16.2	Plants intended for planting of *Rubus* L. a) originating in countries where the following pests are known to occur on *Rubus* L.: - Tomato ringspot nepovirus - Black raspberry latent virus - Cherry leafroll nepovirus - Apple mosaic ilavirus b) other than seeds, originating in non-European countries where the following pests are known to occur on *Rubus* L.: - Raspberry leaf curl luteovirus - Cherry rasp leaf 'nepovirus'	Without prejudice to the requirements listed in Annex 4A, point 16.1: a) The plants shall be free from aphids, including their eggs. and b) There is an official statement that the plants are derived from material which has been maintained under appropriate conditions, and subjected, within the last three complete cycles of vegetation, to official testing for at least the relevant pests using appropriate indicators or equivalent methods, and found free in these tests, from these pests, and no symptoms of the relevant pests have been observed on plants at the place of production or on susceptible plants in its immediate vicinity since the beginning of the last three complete cycles of vegetation.
16.3	Plants intended for planting (other than seeds) of *Rubus* L., originating in countries where the following pests are known to occur: - Arabis mosaic nepovirus - Raspberry ringspot nepovirus, - Strawberry latent ringspot nepovirus - Tomato black ring nepovirus	Without prejudice to requirements in Annex 4A, points 16.1 and 16.2: There is an official statement that no symptoms of the pests in question have been observed on plants at the place of production since the beginning of the last complete cycle of vegetation.
17	Plants intended for planting (other than seeds) of *Malus* Mill., *Prunus* L., *Pyrus* L., *Ribes* L. and *Rubus* L.,originating in countries where non-European viruses and virus-like pathogens are known to occur	Without prejudice to the provisions and requirements applicable to Annex 3, points 4 and 6.1 and Annex 4A, points 10, 11, 12, 13.1, 13.2, 14, 15.1, 15.2, 15.3, 16.1, 16.2 and 16.3: There is an official statement that no symptoms of non-European viruses and virus-like pathogens have been observed on plants at the place of production since the beginning of the last complete cycle of vegetation.
18.1	Tubers of *Solanum tuberosum* L.	Without prejudice to the provisions applicable to Annex 3, point 8: Official statement a) that the tubers originate in countries known to be free from *Ralstonia solanacearum* (Smith) Yabuuchi et al. or b) that the tubers originate in areas under official supervision for *Ralstonia solanacearum* (Smith) Yabuuchi et al., and where this pest is known not to occur and

		that the place of production has been inspected and found to be free from *Ralstonia solanacearum* (Smith) Yabuuchi et al. the last cycle of vegetation.
18.2	Tubers of *Solanum tuberosum* L., originating in countries where *Synchytrium endobioticum* (Schilbersky) Pervical is known to occur	Without prejudice to the provisions and requirements applicable to Annex 3, point 8 and Annex 4A, point 18.1: There is an official statement that the tubers originate in a place of production a) where *Synchytrium endobioticum* (Schilbersky) Percival has never occurred, or b) where, in accordance with an EPPO-recognised method (The European Plant Protection Organization), there is an official statement that *Synchytrium endobioticum* (Schilbersky) Percival no longer occurs.
18.3	Tubers of *Solanum tuberosum* L.	Without prejudice to the provisions and requirements applicable to Annex 3, point 8 and Annex 4A, points 18.1 and 18.2: There is an official statement that the tubers originate a) in a country which is known to be free from *Clavibacter michiganensis* ssp. *sepedonicus* (Spieckermann & Kotthoff) Davis et al., or b) at a place of production which has been inspected during the last cycle of vegetation, and where there has been officially confirmed that the place of production is free from *Clavibacter michiganensis ssp. sepedonicus* (Spieckermann & Kotthoff) Davis et al., either because the pest has never been known to occur at the location or, in the event of the pest being found at the place of production, the premises have been placed under an official eradication programme and official follow-up inspection for *Clavibacter michiganensis* ssp. *sepedonicus* (Spieckermann & Kotthoff) Davis et al.
18.4	Tubers of *Solanum tuberosum* L.	Without prejudice to the provisions and requirements applicable to Annex 3, point 8 and Annex 4A, points 18.1, 18.2 and 18.3: There is an official statement that the tubers were grown in a field which has undergone official inspection at least once during the last four years, by means of an EPPO-recognised method (The European Plant Protection Organization), for *Globodera pallida* (Stone) Behrens and *Globodera rostochiensis* (Wollenweber) Behrens.

18.5	Plants intended for planting (other than seeds) of *Solanaceae,* originating in countries where Potato stolbur phytoplasma is known to occur	Without prejudice to the provisions and requirements applicable to Annex 3, points 8 and 9 and Annex 4A, points 18.1, 18.2, 18.3 and 18.4: There is an official statement that no symptoms of Potato stolbur phytoplasma have been observed on plants at the place of production since the beginning of the last complete cycle of vegetation.
18.6	Plants intended for planting of *Solanaceae*, other than seeds of *Lycopersicon esculentum* Mill., originating in countries where Potato spindle tuber viroid is known to occur	Without prejudice to the provisions and requirements applicable to Annex 3, points 8 and 9 and Annex 4A, point 18.5: There is an official statement that no symptoms of Potato spindle tuber viroid have been observed on the plants at the place of production since the beginning of the last complete cycle of vegetation.
18.7	Plants intended for planting (other than seeds), of *Capsicum annuum* L., *Lycopersicon esculentum* Mill., *Musa* L., *Nicotiana* L. and *Solanum melongena* L., originating in countries in which *Ralstonia solanacearum* (Smith) Yabuuchi et al is known to occur	Without prejudice to the provisions and requirements applicable to Annex 3, point 9 and Annex 4A, points 18.5 and 18.6: There is an official statement that the plants originate in areas known to be free from *Ralstonia solanacearum* (Smith) Yabuuchi et al.
19.1	Plants intended for planting (other than seeds) of *Dendranthema* (DC.) Des Moul., *Dianthus* L. and *Pelargonium* L'Herit. ex Ait	There is an official statement that a) no signs of *Helicoverpa armigera* (Hübner) or *Spodoptera littoralis* (Boisduval) have been observed at the place of production since the beginning of the last complete cycle of vegetation, or b) the plants have undergone appropriate treatment to protect them from the said pests.

19.2	Plants (other than seeds) of *Dendranthema* (DC.) Des Moul., *Dianthus* L. and *Pelargonium* L'Herit. ex Ait.	Without prejudice to requirements in Annex 4A, point 19.1: There is an official statement that a) no signs of *Spodoptera litura* (Fabricius) have been observed at the place of production since the beginning of the last complete cycle of vegetation, or b) the plants have undergone appropriate treatment to protect them from the said pest.
20	Plants intended for planting (other than seeds)of *Dendranthema* (DC.) Des Moul.	Without prejudice to the provisions and requirements applicable to Annex 4A, points 19.1 and 19.2: There is an official statement that a) the plants are no more than third generation stock derived from material found to be free from Chrysanthemum stunt viroid by means of virological tests, or directly derived from material of which a representative sample of at least 10% has been found to be free from Chrysanthemum stunt viroid at an official inspection carried out at the time of flowering, and b) that the plants come from premises which have been officially inspected at least once a month during the three months prior to dispatch, and where no symptoms of *Puccinia horiana* P. Hennings were observed within this period, and which were not located in the immediate vicinity of areas in which, during the three months prior to export, symptoms of *Puccinia horiana* P. Hennings are known to have occurred or the plants have undergone appropriate treatment for the said pest, and c) that the plants are derived in direct line from mother plants which were found free from *Erwinia chrysanthemi* Burkholder et al. pv. *chrysanthemi* by means of officially-approved tests carried out at least once within the last two years.
21	Plants intended for planting (other than seeds)of *Dianthus* L.	Without prejudice to requirements in Annex 4A, points 19.1, 19.2 and 20: There is an official statement that

		a) that the plants are derived in direct line from mother plants which were found free from *Erwinia chrysanthemi* Burkholder et al. pv. *dianthicola*, *Burkholderia caryophylli* (Burkholder) Yabuuchi et al. and *Phialophora cinerescens* (Wollenweber) van Beyma by means of officially-approved tests carried out at least once within the last two years, and b) no symptoms of the said pests have been observed on the plants.
22	Plants intended for planting (other than seeds)of *Pelargonium* L'Herit. ex Ait., originating in countries where Tomato ringspot nepovirus is known to occur	Without prejudice to requirements in Annex 4A, points 19.1 and 19.2: There is an official statement that the plants a) have been cultivated in a growing medium which is free from *Xiphinema americanum* Cobb *sensu lato* or other vectors of Tomato ringspot nepovirus, and b) are directly derived from places of production known to be free from Tomato ringspot nepovirus, or are of no more than fourth generation stock, derived from mother plants found to be free from Tomato ringspot nepovirus by means of an officially-approved system of virological testing.
23	Plants intended for planting (other than seeds)of *Pelargonium zonale* L. L'Herit.ex Ait. and hybrids of this	Without prejudice to requirements in Annex 4A, points 19.1, 19.2 and 22: There is an official statement that the plants come from premises which have been officially inspected at least once a month during the three months prior to dispatch, and where no symptoms of *Puccinia pelargonii-zonalis* Doidge were observed within this period, and which were not located in the immediate vicinity of areas in which, during the three months prior to dispatch, symptoms of P*uccinia pelargonii-zonale* Doidge are known to have occurred.
24	Plants intended for planting (other than seeds)of *Fuchsia,* originating in the USA and Brazil	There is an official statement that a) no signs of *Aculops fuchsiae* Keifer have been observed at the place of production, and b) the plants were inspected immediately prior to export and were found free from *Aculops fuchsiae* Keifer.
25	Bulbs intended for planting of *Tulipa* L. and	There is an official statement that no symptoms of

	Narcissus L., other than in cases where it is marked on the packaging or in some other manner that they are intended for direct sale to end consumers who do not carry out commercial production of cut flowers.	*Ditylenchus dipsaci* (Kühn) Filipjev have been observed on the plants since the beginning of the last complete cycle of vegetation.
26	Plants intended for planting (other than seeds)of *Allium cepa* L.	There is an official statement that a) *Sclerotium cepivorum* Berk is not known to occur at the place of production, and b) the plants have been inspected and found to be free from any symptoms of *Sclerotium cepivorum* Berk at inspections carried out at appropriate times during the last cycle of vegetation.
27.1	Plants intended for planting (other than seeds)of *Apium graveolens* L., *Argyranthemum*, *Aster*, *Brassica*, *Capsicum annuum* L., *Cucumis*, *Dendranthema* (DC.) Des Moul., *Dianthus* L. and hybrids, *Exacum*, *Gerbera* Cass., *Gypsophila* L., *Lactuca*, *Leucanthemum* L., *Lupinus* L., *Lycopersicon esculentum* Mill., *Solanum melongena* L., *Tanacetum* L. and *Verbena* L.	Without prejudice to the provisions and requirements applicable to Annex 3, point 9 and Annex 4A, points 18.5, 18.6, 18.7, 19.1, 19.2, 20 and 21: There is an official statement that no signs of the following pests were observed at the place of production during official inspections carried out at least monthly during the three months prior to export: - *Amauromyza maculosa* (Malloch) - *Liriomyza huidobrensis* (Blanchard) - *Liriomyza sativae* (Blanchard) - *Liriomyza trifolii* (Burgess)
27.2	Plants intended for planting (other than seeds) of other herbaceous species than those specified in Annex 4A, point 27.1, originating in countries in which *Amauromyza maculosa* (Malloch) or *Liriomyza sativae* Blanchard is known to occur	Without prejudice to the provisions and requirements applicable to Annex 3, points 7, 8 and 9 and Annex 4A, points 18.5, 18.6, 18.7, 19.1, 19.2, 22, 23 and 24: There is an official statement that a) no signs of *Amauromyza maculosa* (Malloch) or *Liriomyza sativae* Blanchard were observed at the place of production during an official inspection carried out prior to export, or b) immediately prior to export the plants have been inspected and found free from signs of the relevant pests and have been subjected to an appropriate treatment aimed at eradicating the relevant pests.
28	Plants intended for planting, with roots, grown in the open air	There is an official statement that the place of production is known to be free from *Clavibacter michiganensis* ssp. *sepedonicus* (Spieckermann & Kotthoff) Davis et al., *Globodera pallida* (Stone) Behrens, *Globodera rostochiensis* (Wollenweber) Behrens, *Phytophthora fragariae* Hickman var. *fragariae* Wilcox & Duncan, *Ralstonia solanacearum* (Smith) Yabuuchi et al. and *Synchytrium endobioticum* (Schilbersky) Percival.
29.1	Soil and growing medium attached or	Official statement:

	associated with plants intended for planting, originating in non-European countries	a) that the growing medium at the time of planting was free from soil and organic matter or was found free from insects and harmful nematodes and has been subjected to appropriate examination or treatment to ensure it is free from other pests or has undergone appropriate heat treatment or fumigation to ensure freedom from pests, and b) that, since planting, the growing medium has been subjected to appropriate measures to ensure that it has been maintained free from pests or that the plants, during the last two weeks prior to dispatch, were shaken free of the medium leaving the minimum amount necessary to sustain vitality during transport, and, in the event of replanting, that the growing medium used meets the requirements laid down in point a).
29.2	Plants intended for planting, with growing medium, traded in pots or other containers, originating in countries where *Arthurdendyus triangulatus* is known to occur	There is an official statement that a) the consignment originates from a place of production found free from *Arthurdendyus triangulatus* (Dendy) by means of an EPPO-recognised method (The European Plant Protection Organization), or b) the plants have been grown on raised benches (slatted or open-meshed), or c) the consignment has been subjected to an EPPO-recommended disinfestation treatment to eliminate *Arthurdendyus triangulatus* (Dendy).
30	Plants intended for planting (other than seeds)	There is an official statement that a) the plants originate in a country known to be free from *Thrips palmi* Karny, or b) the place of production was found to be free from *Thrips palmi* Karny at official inspections carried out at least monthly during the three months prior

		to export, or c) the consignment has undergone appropriate treatment to ensure freedom from *Thysanoptera*.
31	Plants intended for planting (other than seeds and plants in tissue culture), originating in non-European countries (other than Mediterranean countries)	Without prejudice to the provisions and requirements applicable to Annex 3, points 1.1, 2, 3, 4, 5, 6.1, 6.2, 7, 8 and 9 and Annex 4A, points 6, 7, 8, 9, 10, 11, 12, 13.1, 13.2, 14, 15.1, 15.2, 15.3, 16.1, 16.2, 16.3, 17, 18.5, 18.6, 18.7, 19.1, 19.2, 20, 21, 22, 23, 24, 25, 26, 27.1, 27.2, 28, 29.2 and 30: There is an official statement that the plants a) are free from any plant debris and b) have been grown in nurseries and c) have been inspected at appropriate times and prior to export and found to be free from any symptoms of harmful bacteria, viruses and virus-like pathogens, and either found free from any symptoms or signs of harmful nematodes, insects, mites and fungi, or have been subjected to appropriate treatment to eradicate such organisms.
32	Plants intended for planting (other than seeds and plants in tissue culture) of deciduous trees and shrubs, originating in non-European countries, other than the Mediterranean countries	Without prejudice to the provisions and requirements applicable to Annex 3, points 1.1, 2, 3, 4, 5, 6.1, 6.2 and 9 and Annex 4A, points 7, 8, 9, 10, 11, 12, 13.1, 13.2, 14, 15.1, 15.2, 15.3, 16.1, 16.2, 16.3, 17, 18.5, 18.6, 28, 29.2, 30 and 31: There is an official statement that the plants are dormant and are free from leaves, flowers and fruits.
33	Seeds of *Lycopersicon esculentum* Mill.	There is an official statement that the seeds have been obtained by a suitable acid extraction method or an alternative, equivalent method, and that a) the seeds originate in areas in which *Clavibacter michiganensis michiganensis* (Smith) Davis et al., or *Xanthomonas vesicatoria* (ex Doidge) Vauterin et al and Potato spindle viroid are not known to occur, or b) no symptoms of diseases caused by these pests have been observed on the plants at the place of production since the last complete cycle of vegetation, or c) the seeds have been subjected to official testing for the said pests, on a representative sample and using appropriate methods, and were found in the

		tests to be free from these pests.
34	Seeds of the genera *Triticum* L., *Secale* L. and x *Triticosecale* from Afghanistan, India, Iraq, Mexico, Nepal, Pakistan and the USA where *Tilletia indica* Mitra is known to occur	There is an official statement that the seeds originate in an area in which *Tilletia indica* Mitra is known not to occur. The name of the area shall be stated on the phytosanitary certificate accompanying the consignment.
35	Grain of the genera *Triticum* L., *Secale* L. and X *Triticosecale* from Afghanistan, India, Iraq, Mexico, Nepal, Pakistan and the USA where *Tilletia indica* Mitra is known to occur	There is an official statement that a) the grain originates in an area in which *Tilletia indica* Mitra is known not to occur. The name of the area shall be stated on the phytosanitary certificate accompanying the consignment, or b) no symptoms of *Tilletia indica* Mitra have been observed on the plants at the place of production during their last complete cycle of vegetation, and representative samples of the grain have been taken both at the time of harvest and before shipment and have been tested and found free from *Tilletia indica Mitra* in these tests. The latter shall be stated on the phytosanitary certificate accompanying the consignment as 'inspected and found free from *Tilletia indica Mitra*'.
36	Soil and other organic growing media	Without prejudice to the provisions applicable to Annex 3, point 10: There is an official statement that the place of production is known to be free from *Clavibacter michiganensis* ssp. *sependonicus* (Spieckermann & Kotthoff) Davis et al., *Globodera pallida* (Stone) Behrens, *Globodera rostochiensis* (Wollenweber) Behrens, *Phytophthora fragariae* Hickman var. *fragariae* Wilcox & Duncan, *Ralstonia solanacearum* (Smith) Yabuuchi et al. and *Synchytrium endobioticum* (Schilbersky) Percival.

Annex 4B

Specific requirements for domestic production and sale of certain plants and other regulated articles

No.	Plants and other regulated articles	Specific requirements
1	Plants intended for planting (other than seeds) of - *Amelanchier* Medik. - *Choenomeles* Lindl. - *Cotoneaster* Medik. - *Crataegus* L. - X *Crataemespilus* E.G. Camus - *Cydonia* Mill. - *Eriobotrya* Lindl. - *Malus* Mill. - *Mespilus* L. - *Pyracantha* Roem. - *Pyrus* L. - *Sorbus* L. except *Sorbus intermedia* (Ehrh.) Pers. - *Stranvaesia* Lindl.	Without prejudice to the provisions applicable to Annex 7, There is an official statement that a) the plants originate from areas recognised to be free from *Erwinia amylovora* (Burrill) Winslow et al. and b) the place of production is under official control for *Erwinia amylovora* (Burrill) Winslow et al.
2.1	Plants intended for planting (other than seeds) of *Fragaria* L.	There is an official statement that a) *Phytophthora fragariae* Hickman var. *fragariae* Wilcox & Duncan is not known to occur at the place of production, and b) the plants at the place of production have been subjected to official testing for *Phytophthora fragariae* Hickman var. *fragariae* Wilcox & Duncan during the last complete cycle of vegetation, and c) no symptoms of diseases caused by the following pests have been observed on plants at the place of production since the beginning of the last complete cycle of vegetation.: - Arabis mosaic nepovirus - Raspberry ringspot nepovirus - Strawberry crinkle cytorhabdovirus - Strawberry latent ringspot nepovirus - Strawberry mild yellow edge disease - Tomato black ring nepovirus - *Xanthomonas fragariae* Kennedy & King
2.2	Plants intended for planting (other than seeds) of *Fragaria* L.	Without prejudice to the provisions applicable to Annex 4B, point 2.1:

		Documentation must exist confirming that the plants a) are derived from Norwegian material or b) are derived from material which has been subjected to official quarantine testing in Norway using suitable methods, and which, by these examinations, have been found free from the pests specified in Annexes 1 and 2.
3	Plants intended for planting (other than seeds) of *Malus* Mill.	Without prejudice to the provisions applicable to Annex 4B, point 1: There is an official statement that a) the plants originate from areas known to be free from Apple proliferation phytoplasma, or b) the plants (other than those raised from seeds) are derived in direct line from material which has been maintained under appropriate conditions and have been subjected, within the last the six last finished cycles of vegetation, at least once, to official testing for Apple proliferation phytoplasma using appropriate indicators or equivalent methods, and which have been found free, in these tests, from this pest and no symptoms of diseases caused by Apple proliferation phytoplasma have been observed at the place of production or on susceptible plants in its immediate vicinity since the beginning of the last three complete cycles of vegetation.
4	Plants intended for planting (other than seeds) of the following species of *Prunus* L.: - *Prunus armeniaca* L. - *Prunus blireiana* Andre - *Prunus brigantina* Vill. - *Prunus cerasifera* Ehrh. - *Prunus cistena* Hansen - *Prunus curdica* Fenzl et Fritsch. (Zander) - *Prunus domestica* L. *domestica* (Borkh) Schneid. - *Prunus domestica* L. *insititia* (L.) C.K. Schneid. - *Prunus domestica* L. *italica* (Borkh.) Gams - *Prunus dulcis* (Mill.) D.A. Webb - *Prunus glandulosa* Thunb. ex Murr. - *Prunus holosericea* Batal - *Prunus hortulana* L.H. Bailey - *Prunus japonica* Thunb. ex Murr. - *Prunus mandshurica* (Maxim.) Koehne - *Prunus maritima* Marsh.	There is an official statement that a) the plants originate from areas known to be free from Plum pox potyvirus, or b) the plants (except those raised from seeds) are derived in direct line from material which is maintained under appropriate conditions and subjected, within the last three complete cycles of vegetation, at least once to official testing for Plum pox potyvirus by means of suitable indicators or equivalent methods, and were found to be free, in these tests, from this pest. and no symptoms of disease caused by Plum pox potyvirus have been observed at the place of production or on susceptible plants in its immediate vicinity since the beginning of the last three complete cycles of vegetation. and

	- *Prunus mume* Sieb. et Zucc. - *Prunus nigra* Ait. - *Prunus persica* (L.) Batsch - *Prunus salicina* L - *Prunus sibirica* L - *Prunus simonii* Carr. - *Prunus spinosa* L. - *Prunus tomentosa* Thunb. ex Murr. - *Prunus triloba* Lindl. - other species of *Prunus* L. which are susceptible to Plum pox potyvirus	c) plants at the place of production which have shown symptoms of disease caused by other viruses or other virus-like pathogens have been rogued out.
5	Plants intended for planting (other than seeds) of *Rubus* L.	There is an official statement that a) *Phytophthora fragariae* Hickman var. *rubi* Wilcox & Duncan is not known to occur at the place of production, and b) no symptoms of diseases caused by the following pests have been observed on the plants at the place of production since the beginning of the last complete cycle of vegetation: - Arabis mosaic nepovirus - Raspberry ringspot nepovirus - Strawberry latent ringspot nepovirus - Tomato black ring nepovirus
6.1	Tubers of *Solanum tuberosum* L., other than tubers intended for planting (seed potatoes)	Every lot shall a) originate in a place of production where the following pests are not known to occur: - *Clavibacter michiganensis* ssp. *sependonicus* (Spieckermann & Kotthoff) Davis et al. - *Synchytrium endobioticum* (Schilbersky) Percival - *Globodera pallida* (Stone) Behrens - Resistance breaking pathotypes of *Globodera rostochiensis* (Wollenweber) Behrens and b) be labelled so as to enable identification of the producer and the place of production.
6.2	Tubers of *Solanum tuberosum* L. intended for planting (seed potatoes)	There is an official statement that the place of production is known to be free from the following pests: - *Clavibacter michiganensis* ssp. *sependonicus* (Spieckermann & Kotthoff) Davis et al. - *Globodera pallida (*Stone) Behrens - *Globodera rostochiensis* (Wollenweber) Behrens - *Synchytrium endobioticum* (Schilbersky) Percival

6.3	Tubers of *Solanum tuberosum* L. intended for planting (seed potatoes) and plants intended for planting of other species of *Solanum* L. which form stolons or tubers, or hybrids of these	Without prejudice to the provisions applicable to Annex 4B, point 6.2: Documentation must exist confirming that the tubers or plants a) originate from Norwegian material or b) are derived in direct line from material which has been subjected to official quarantine testing in Norway using suitable methods, and which, by these examinations, have been found free from the pests specified in Annexes 1 and 2.
7	Plants intended for planting (other than seeds) of *Dendranthema* (DC) Des. Moul., *Dianthus* L. and *Pelargonium* L'Herit. ex Ait.	There is an official statement that : a) no signs of *Helicoverpa armigera* (Hübner) or *Spodoptera littoralis* (Boisduval) have been observed at the place of production since the beginning of the last complete cycle of vegetation, or b) the plants have undergone appropriate treatment against the said pests.
8	Plants intended for planting (other than seeds) of *Dendranthema* (DC.) Des. Moul	Without prejudice to the provisions applicable to Annex 4B, point 7: There is an official statement that : a) the plants are no more than third generation stock derived from material found to be free from Chrysanthemum stunt viroid by means of virological tests, or directly derived from material of which a representative sample of at least 10% has been found to be free from Chrysanthemum stunt viroid at an official inspection carried out at the time of flowering, and b) the plants originate from an area known to be free from *Puccinia horiana* P. Hennings or come from premises which have been officially inspected at least once a month during the three months prior to dispatch, and where no symptoms of *Puccinia horiana* P. Hennings were observed during this period, and which were not located in the immediate vicinity of areas in which, during the three months prior to dispatch, symptoms of *Puccinia horiana* P. Hennings are known to have occurred or have undergone appropriate treatment against the said

		pest, and c) that the plants are derived in direct line from mother plants which were found free from *Erwinia chrysanthemi* Burkholder et al. pv. *chrysanthemi* by means of officially-approved tests carried out at least once within the last two years.
9	Plants intended for planting (other than seeds) of *Dianthus* L.	Without prejudice to the requirements applicable to Annex 4B, point 7: There is an official statement that : a) that the plants are derived in direct line from mother plants which were found free from *Erwinia chrysanthemi* Burkholder et al. pv. *dianthicola*, *Burkholderia caryophylli* (Burkholder) Yabuuchi et al. and *Phialophora cinerescens* (Wollenweber) van Beyma by means of officially-approved tests carried out at least once within the last two years, and b) no symptoms of the said pests have been observed on the plants.
10	Plants intended for planting (other than seeds) of *Pelargonium zonale* (L.) L'Herit.ex Ait. and hybrids of this	Without prejudice to the provisions applicable to Annex 4B, point 7: There is an official statement that the plants a) originate from an area which is known to be free from P*uccinia pelargonii-zonalis* Doidge or b) come from premises which have been officially inspected at least once a month during the three months prior to dispatch, and where no symptoms of *Puccinia pelargonii-zonalis* Doidge were observed during this period, and which were not located in the immediate vicinity of areas in which, during the three months prior to dispatch, symptoms of P*uccinia pelargonii-zonale* Doidge are known to have occurred.
11	Plants intended for planting (other than seeds) of *Apium graveolens* L., *Argyranthemum* spp., *Aster* spp., *Brassica* spp., *Capsicum annuum* L., *Cucumis* spp., *Dendranthema* (DC.) Des Moul., *Dianthus* L. and hybrids, *Exacum* spp., *Gerbera* Cass., *Gypsophila* L, *Lactuca* spp., *Leucanthemum* L., *Lupinus* L., *Lycopersicon esculentum* Mill., *Solanum melongena* L., *Spinacia* L., *Tanacetum* L. and *Verbena* L.	Without prejudice to the provisions applicable to Annex 4B, point 7: There is an official statement that a) the plants originate from an area which is known to be free from *Liriomyza huidobrensis* (Blanchard) and *Liriomyza trifolii* (Burgess) or b) no signs of *Liriomyza huidobrensis* (Blanchard) and *Liriomyza trifolii* (Burgess) have been observed at the place of production during official inspections carried out at least once a month during the three months prior

		to dispatch.
12	Plants intended for planting (other than seeds) of *Allium cepa* L. var. *cepa*	There is an official statement that a) *Sclerotium cepivorum* Berk is not known to occur at the place of production, and b) the plants have been inspected and found free from any symptoms of *Sclerotium cepivorum* Berk during inspections carried out at appropriate times within the last cycle of vegetation.
13	Plants intended for planting, with roots, grown in the open air	There is an official statement that the place of production is known to be free from *Clavibacter michiganensis* ssp. *sepedonicus* (Spieckermann & Kotthoff) Davis et al., *Globodera pallida* (Stone) Behrens, *Globodera rostochiensis* (Wollenweber) Behrens, *Phytophthora fragariae* Hickman var. *fragariae* Wilcox & Duncan and *Synchytrium endobioticum* (Schilbersky) Percival.

14	Soil and other organic growing media	There is an official statement that the place of production is known to be free from *Clavibacter michiganensis* ssp. *sepedonicus* (Spieckermann & Kotthoff) Davis et al., *Globodera pallida* (Stone) Behrens, *Globodera rostochiensis* (Wollenweber) Behrens, *Phytophthora fragariae* Hickman var. *fragariae* Wilcox & Duncan, *Ralstonia solanacearum* (Smith) Yabuuchi et al. and *Synchytrium endobioticum* (Schilbersky) Percival.

Annex 5

Plants and other regulated articles which must be accompanied by a phytosanitary certificate on import

No.	Plants and other regulated articles
1	Plants intended for planting, other than seeds
2	Pollen for pollination and fresh cut branches of: *Amelanchier* Medic., *Choenomeles* Lindl. *Cotoneaster* Medic. *Crataegus* L. X *Crataemespilus* E.G. Camus *Cydonia* Mill. *Eriobotrya* Lindl *Malus* Mill. *Mespilus* L. *Pyracantha* M.J. Roem *Pyrus* L. *Sorbus* L. except *Sorbus intermedia* (Ehrh.) Pers. *Stranvaesia* Lindl.
3.1	Seeds of: *Lycopersicon esculentum* Mill. *Allium cepa* L. var *cepa* *Allium porrum* L. *Allium schoenoprasum* L.
3.2	Seeds and grain of: *Triticum* L. *Secale* L. *X Triticosecale* originating in Afghanistan, India, Iraq, Mexico, Nepal, Pakistan, USA
4.1	Cut flowers of: *Gerbera* L. *Dianthus* L. *Rosa* L.
4.2	Cut flowers of: *Dendranthema* (DC.) Des Moul. *Gypsophila* L. *Pelargonium* L'Herit ex Ait.
4.3	Cut flowers of *Orchidaceae* originating in Thailand
5.1	Fresh (not preserved) fruits of: *Citrus* L, *Fortunella* Swingle, *Poncirus* Raf. and hybrids of these *Malus* Mill. *Prunus* L. *Pyrus* L. *Vitis* L.

5.2	Fresh (not preserved) fruits of *Vaccinium* L. originating in non-European countries
5.3	Fresh (not preserved) fruits, imported during the period 16 April to 30 September, of: *Fragaria* L. *Ribes nigrum* L. *Ribes rubrum* L. *Ribes uva-crispa* L. *Rubus idaeus* L.
6.1	Fresh (not preserved) vegetables of: *Allium cepa* L. Unwashed vegetables with roots
6.2	Fresh (not preserved) vegetables, imported during the period 16 April to 30 September, of: *Apium graveolens* L. var. *dulce* (Mill.) Pers. *Brassica oleracea* L. convar. *botrytis* (L.) Alef. var. *botrytis* L. *Brassica oleracea* L. convar. *botrytis* (L.) Alef. var. *italica* Plenck *Cichorium intybus* L. var. *foliosum* Hegi *Cucumis melo* L. *Foenicum vulgare* Mill. *Lactuca* L. *Lycopersicon esculentum* Mill. *Solanum melongena* L
7	Potatoes (*Solanum tuberosum* L.)
8	Wood, including wood which has not kept its natural rounded surface, in the following cases: a) the wood has been obtained in whole or part from one of the following genera or order: *Castanea* Mill., originating in non-European countries *Coniferales*, originating in non-European countries and Portugal *Populus* L., originating in non-European countries *Quercus* L., originating in non-European countries and b) the wood corresponds with one of the following item numbers in the customs tariff schedule: 440110 Fuel wood in logs, in billets, in twigs, in faggots or similar 440121 Wood in chips or particles of *Coniferales* spp. 440122 Wood in the form of chips or particles of deciduous trees 440130 Wood waste and scrap , but not agglomerated in logs, bricks, pellets or similar forms 440320 Wood of *Coniferales* spp. in the rough, whether or not stripped of bark or sapwood or squared, other than wood treated with paint, stains, creosote or other preservatives 440391 Wood of *Quercus* spp. in the rough, whether or not stripped of bark or sapwood or squared, other than wood treated with paint, stains, creosote or other preservatives 440399 Wood of of other types of tree than *Coniferales*, tropical tree species, *Quercus* spp. and *Fagus* spp., in the rough, whether or not stripped of bark or sapwood or squared, other than wood treated with paint, stains, creosote or other preservatives 440410 Split poles, piles, pickets and stakes of wood and rods, painted, but not sawn lengthwise of *Coniferales* spp. 440420 Split poles, piles, pickets and stakes of wood and rods, painted, but not sawn lengthwise, of deciduous trees

	440610 Railway or tramway sleepers, not impregnated 440710 Wood sawn or chipped lengthwise, sliced or peeled, including wood planed, sanded or finger-joined, of a thickness exceeding 6mm, in particular beams, planks, flitches, boards and laths of *Coniferales* spp. 440791 Wood sawn or chipped lengthwise, sliced or peeled, including wood planed, sanded or finger-joined, of a thickness exceeding 6mm, in particular beams, planks, flitches, boards and laths of *Quercus* spp. 440799 Wood sawn or chipped lengthwise, sliced or peeled, including wood planed, sanded or finger-joined, of a thickness exceeding 6mm, in particular beams, planks, flitches, boards and laths, of other types of wood than C*oniferales*, tropical tree species, *Quercus* spp. and *Fagus* spp. 441510 Cases**,** boxes, crates, drums and other similar wooden forms of packaging, wooden cable drums 441520 Pallets, box pallets and other load boards. Load pallets and crate pallets are exempt from requirements for phytosanitary certification if they satisfy the standards for "UIC pallets" and are marked accordingly. 44160010 Casks, barrels, vats, bowls and other coopered articles, including wooden parts thereto, including here barrel staves, of *Quercus* spp. 9406002 Pre-fabricated wooden buildings, houses, cabins, huts
9	Soil, growing media and soil improvers, which consist in whole or in part of the following: Soil Peat[1)] Bark Compost Natural fertilizers *[1)] Growing media that are composed entirely of peat and originating in European countries, are exempt from the requirement for phytosanitary certification*

Annex 6

Pests for which there can be laid down provisions for control in specific restricted areas

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Name

Heterobasidion annosum (Fr.) Bref.
Ophiostoma novo-ulmi Brasier
Ophiostoma ulmi (Buisman) C. Moreau

Annex 7

Plants intended for planting which are prohibited to plant and sell

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Name

Cotoneaster bullatus Bois
Cotoneaster salicifolius Franch.
Cotoneaster Wateri-hybrider

Annex 8

Labelling and documentation requirements

I. Plants intended for further commercial cultivation

A. All units shall on sale be labelled with:
- a The producer's or retail link's registration number for the Norwegian Agricultural Inspection Service
- b Botanical name and, if appropriate, name of variety. For fruit trees the variety of the rootstock shall also be supplied
- c Serial number

B. The following information shall also be supplied, either in the form of labelling or through supplementary documentation:
- d The amount stated per item, kg or other unit
- e The country of origin or re-export in the case of the plants being imported
- f For plants raised from seeds: the reference number of the seed lot
- g For certified plant material: certification category

The plants or the packaging shall be labelled in such a way to prevent mix-ups after removal.

II. Nursery stock, except plants intended for further commercial cultivation

A. The plants, as they appear for sale to the end consumer, shall be labelled with:
- a The producer's or retail link's registration number for the Norwegian Agricultural Inspection Service
- b Botanical name and, if appropriate, name of variety. For fruit trees the variety of the rootstock shall also be supplied

B. Up until the final retail link, the following information must also be provided:
- c Serial number
- d The amount specified per item, kg or other unit
- e The country of origin or re-export in the event of the plants being imported

Information in accordance with point c is to be provided by labelling all units, while information in accordance with points d and e is to be supplied either by labelling or through supplementary documentation.

The plants or the packaging shall be labelled.

III. Plants intended for planting, other than those specified in I and II

All units shall be labelled with the following up until the last retail link:
- a The producer's or retail link's registration number for the Norwegian Agricultural Inspection Service
- b Botanical name and, if appropriate, name of variety.

The plants or the packaging shall be labelled.

Annex 9

Plants which, in accordance with section 19, are exempt from requirements for phytosanitary certification

Country of origin	**Type of commodity and amount**
From European countries	Up to 25 cut flowers Up to 10 kg of fruit, berries and vegetables, other than potatoes Up to 3 kg of flower bulbs and corms, other than plants mentioned in Annex 3 Up to 5 pot plants (household plants), other than plants mentioned in Annex 3
From non-European countries	Up to 25 cut flowers Up to 10 kg of fruit, berries and vegetables, other than potatoes Up to 3 kg of flower bulbs and corms, other than plants mentioned in Annex 3

Annex 10

Definitions

The following definitions apply in these regulations:

Country of origin: The country in which the plants have been grown, or in the case of replanting, where they were grown during the last growing season. For plants propagated from cuttings, the country of origin is also the country in which the rooting has taken place.

Nursery plants:
a) Woody ornamental plants for cultivation in the open air
b) Perennial herbaceous ornamental plants for cultivation in the open air (except flower bulbs and dormant corms)
c) Plants for fruit and berry production

Pest: Organisms (including, amongst others, plants, bacteria, fungi and close organisms, nematodes, insects, mites and other animals) or viruses, viroids and other forms of pathogenic agents, which can be injurious to plants or their growth conditions.

Place of production Any premises or collection of fields operated as a single production or farming unit. A place of production may include several production sites which are separately managed for phytosanitary purposes.

Planting: Any operation for the placing of plants to ensure their subsequent growth, reproduction and propagation.

Plants: Plants intended for planting and other living parts of plants.
Living parts of plants include, amongst others:
- fruit, in the botanical sense (not deep-frozen)
- vegetables (not deep-frozen)
- tubers and corms, bulbs and rhizomes
- cut flowers
- branches with foliage
- cut trees with foliage

Plants and other regulated articles: Plants, as well as, for example, wood, grain, mushrooms, growing media and other items which can carry infestations of pests.

Plants intended for planting:
a) Plants which are already planted and are intended to remain planted or to be replanted
b) Plants which have not been planted yet, but which are to be planted, including, among other things, seeds, scions, budding materials, plant tissue cultures, bulbs and corms.

Sale and marketing: Sale, marketing and distribution.

Seeds: Seeds in the botanical sense, except seeds which are not intended for planting.

spp.: Species

Wood: If nothing else is specified in particular:
a) Wood with or without bark, which carries its natural, rounded surface wholly or partly, and wood waste, chips, etc. which

originate from such wood.

b) Wood used in the form of dunnage, pallets or packing materials, if these are deemed likely to carry or spread pests.