The Food & Environment Research Agency

Rapid Pest Risk Analysis (PRA) for

Aphis spiraecola

STAGE 1: INITIATION

1. What is the name of the pest?

Aphis spiraecola Patch (Hemiptera, Aphididae) – Spiraea aphid (also Green citrus aphid).

Synonyms: many, due to historic confusion over its identity; most common is *Aphis citricola* van der Goot (see CABI, 2013).

2. What initiated this rapid PRA?

The UK Plant Health Risk Register identified the need to update the first UK PRA (MacLeod, 2000), taking into account recent information on hosts, impacts, vectored pathogens and UK status.

3. What is the PRA area?

The PRA area is the United Kingdom of Great Britain and Northern Ireland.

STAGE 2: RISK ASSESSMENT

4. What is the pest's status in the EC Plant Health Directive (Council Directive 2000/29/EC[1]) and in the lists of EPPO[2]?

Aphis spiraecola is not listed in the EC Plant Health Directive, not recommended for regulation as a quarantine pest by EPPO and it is not on the EPPO Alert List.

5. What is the pest's current geographical distribution?

Aphis spiraecola probably originates in the Far East. It is now very widespread around the world in temperate and tropical regions, occurring across every continent except Antarctica (CABI, 2013).

In Europe, *A. spiraecola* is found around the Mediterranean, with a patchy Balkan distribution and it is absent from Scandinavia and the Baltic states. It is stated as present in: Spain, Portugal, France, Switzerland, Italy, Slovenia, Croatia, Serbia, Hungary, Bulgaria, Greece, Cyprus, Malta, and Russia (west of the Urals) (CABI 2013). It is not confirmed as being established in the Netherlands, either outdoors or under protection. The CABI (2013) statement of its occasional presence there is based on Furk (1979), who found *A. spiraecola,* at an English nursery, on two consignments of *Yucca* plants imported from the Netherlands and Honduras. This does not prove that *A. spiraecola* is, or was, established in the Netherlands.

[1] http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CONSLEG:2000L0029:20100113:EN:PDF
[2] https://www.eppo.int/QUARANTINE/quarantine.htm

6. Is the pest established or transient, or suspected to be established/transient in the UK/PRA Area? *(Include summary information on interceptions and outbreaks here).*

Aphis spiraecola is considered absent from the UK but there is uncertainty over its status. Temporary colonies of *A. spiraecola* were found on self-seeded *Cotoneaster* in 1995 (in London – Martin, 1996) and on *Viburnum tinus* in 2007 (Cardiff Bay – E. Baker pers. comm.). These populations were only detected by aphid specialists; *A. spiraecola* is very similar to other *Aphis* spp. and can only be distinguished by microscopic examination. As numerous other *Aphis* spp. occur on the same hosts as *A. spiraecola* (DBIF, 2014), it is possible that *A. spiraecola* is present but unrecognised.

A. spiraecola has not been detected by the Royal Horticultural Society's (RHS) advisory service (A. Salisbury pers. comm.), which screens many garden pests sent in by the RHS membership (centred on south-east England). However, this service would not normally identify aphids to species, unless an unusual case appeared.

Similarly, it is unknown whether *A. spiraecola* has occurred in samples from the Rothamsted Insect Survey's suction trap network, as not all *Aphis* are identified to species. In northern France and Belgium, *A. spiraecola* was generally only caught occasionally in a network of suction traps between 1980 and 2004 (pers. comm. R. Harrington, Rothamsted Insect Survey).

A. spiraecola has also been intercepted 13 times by UK plant health inspectors since 1999, but there have been no outbreaks associated with trade pathways. The interceptions occurred on a range of woody and herbaceous ornamental plants from within and outside the EU, e.g. *Nerium oleander*, *Malus* (bonsai), *Leucodendron* and *Stephanotis*.

7. What are the pest's natural and experimental host plants; of these, which are of economic and/or environmental importance in the UK/PRA area?

Whenever an aphid can overwinter in the egg stage on a host it is termed the primary host; for *Aphis spiraecola* this is either *Spiraea*, *Malus* (both Rosaceae) or *Citrus* (Rutaceae). In spring, *A. spiraecola* migrates to a secondary host, where it completes its life cycle parthenogenetically, before returning to the primary host in autumn. There is uncertainty over host use in any particular area because *A. spiraecola* can occur as different biotypes, at least on *Citrus* and *Spiraea*. These biotypes display differential selection of, and performance on, their secondary hosts (Komazaki 1991).

Across much of its geographic range, *A. spiraecola* persists year-round on secondary hosts, of which more than 65 genera and 20 families have been recorded. It prefers woody shrubs in the Astercaeae, Caprifoliaceae, Rosaceae, Rubiaceae and Rutaceae (CABI, 2013).

Outside in the UK, economically important hosts include: *Apium graveolens* (celery), *Daucus carota* (carrot), *Juglans regia* (walnut), *Lactuca sativa* (lettuce) *Malus domestica* (dessert and cider apples), *Prunus domestica* (plums), *Pyrus communis* (pear), *Solanum tuberosum* (potato), *Zea mays* (maize) and woody, ornamental shrubs or trees (especially *Cotoneaster*, *Malus*, *Spiraea* and *Viburnum*) (CABI, 2013).

Indoors, economically important hosts are *Capsicum* (peppers), *Cucumis sativus* (cucumbers) and ornamental shrubs (including *Citrus*).

Environmentally important hosts include: *Crataegus* (hawthorns), *Malus sylvestris* (crab apple) and *Prunus* (CABI, 2013).

8. What pathways provide opportunities for the pest to enter and transfer to a suitable host and what is the likelihood of entering the UK / PRA area? (*By pathway*):

8.1 Plants for planting: *Aphis spiraecola* is <u>likely</u> to enter the UK on plants for planting. It has been intercepted less than once a year (1999-2014) on live ornamental plants (leaves and flowers), originating from within the EU (Spain and Italy – Sicily) and from third countries

(Australia, Canary Islands, Israel, Japan and Zimbabwe). *A. spiraecola* is most likely to be introduced to nurseries and garden centres as nymphs and adults on primary and secondary hosts; or as overwintering eggs on primary hosts only. *A. spiraecola* is a small aphid (c. 2mm) and would probably go undetected unless there was a heavy infestation. Several interceptions only occurred when *A. spiraecola* accompanied more abundant aphids, of a different species, on a host.

8.2 Natural spread: *Aphis spiraecola* is moderately likely to enter the UK by natural spread, although its presence or absence in UK suction trap samples remains unknown (pers. comm. M. Taylor, Rothamsted Insect Survey). *A. spiraecola* occurs throughout the world and it has spread rapidly once detected in new areas, at least in warm climates (e.g. south-east Europe in the 2000s).

Northern France is the closest, confirmed source of *A. spiraecola*, which, like other aphids, could move long distances on air currents. *A. spiraecola* has been identified in samples from 13 suction traps in northern France and Belgium. However, it occurred sporadically (in fewer than one third of years), in very low numbers (usually < 5 specimens in any year) from the 1980s to 2000s (R. Harrington pers. comm., EXAMINE project).

According to mounted slides (Leclant collection), *A. spiraecola* is recorded under protection, in commercial nurseries, from just two departments (near Paris: Yvelines and Loiret, on *Photinia*, *Viburnum*, *Hibiscus* and *Lagerstroemia);* outside, it is recorded only in Maine et Loire (southern Brittany), on apple (pers. comm. J-F Germain, ANSES; Annex 1).

Based on the current distribution of *A. spiraecola* in northern France and past evidence from suction traps, there is a degree of uncertainty as to the likelihood of aphids reaching the UK. *A. spiraecola* occurs infrequently in northern France; if this is the only probable source of colonists, then the likelihood seems lower than if aphids are able to move from southern France, where *A. spiraecola* is more abundant and widespread.

8.1 Plants for planting	Very unlikely	☐	Unlikely	☐	Moderately likely	☐	**Likely**	☑	Very likely	☐
Confidence	High Confidence	☑	Medium Confidence	☐	Low Confidence	☐				
8.2 Natural spread	Very unlikely	☐	Unlikely	☐	**Moderately likely**	☑	Likely	☐	Very likely	☐
Confidence	High Confidence	☐	Medium Confidence	☑	Low Confidence	☐				

9. How likely is the pest to establish outdoors or under protection in the UK/PRA area?

9.1 Outdoors: *A. spiraecola* is moderately likely to establish because, although its hosts are abundant and it could complete its life cycle in the UK climate, it is absent from northern Europe and two UK colonies did not persist. This assessment is made with moderate confidence because *A. spiraecola's* current, continental European distribution is uncertain, except for in France.

Three of the main hosts of *Aphis spiraecola* - *Malus, Pyrus* and *Spiraea* - are widespread and common: *Malus* and *Pyrus* occur in orchards, gardens and the countryside; while *Spiraea* is found in ornamental plantings. Among minor hosts, woody shrubs are also abundant as ornamentals and field crops offer a range of opportunities for colonisation.

Colonies have been found twice outdoors, in 1995 and 2007, but monitoring showed that neither persisted a year later and the reason for this is unknown. The optimum temperature

for development is 25˚C (at constant temperature - Wang & Tsai, 2000). Estimates of the developmental threshold are variable: based on development at constant temperatures, these range from 5.8-7.4˚C on different hosts (Satar & Uygun, 2008) to 2.3˚C (Wang & Tsai, 2000). This suggests that *A. spiraecola* is likely to be able to complete its development in the UK climate because the generation time is 35 days at 10˚C constant temperature (Wang & Tsai, 2000).

Although *A. spiraecola* has spread in Europe, it remains unreported from Scandinavia, the Baltic states and Germany. It has been reported from suction trap samples in northern France and Belgium since the 1980s (R. Harrington pers. comm., EXAMINE project), but establishment is limited: most northern French records are from under glass and it is only known from apple in one department (pers. comm. J-F Germain, ANSES; Annex 1). This suggests that the UK lies at the limits of the aphid's range.

9.2 Under protection: *A. spiraecola* is likely to establish under protection because it has done so elsewhere in Europe, on ornamental plants only (e.g. Bulgaria - Yovkova *et al.*, 2013; France – pers. comm. J-F Germain, ANSES). It would build up populations faster than outside because it develops well from 20-30˚C (Wang & Tsai, 2000). *A. spiraecola* is likely to establish in botanic collections if infested plants are introduced alongside other suitable hosts. It is less likely to establish on crops under protection due to breaks in cultivation and if growers use clean stock. Although numerous minor hosts are grown as important crops indoors, *A. spiraecola* may not be reach them easily as it is unlikely to be abundant in the wider environment outdoors.

9.1 Outdoors	Very unlikely	☐	Unlikely	☐	**Moderately likely**	☑	Likely	☐	Very likely	☐
Confidence	High Confidence	☐	Medium Confidence	☑	Low Confidence	☐				
9.2 Under Protection	Very unlikely	☐	Unlikely	☐	Moderately likely	☐	**Likely**	☑	Very likely	☐
Confidence	High Confidence	☑	Medium Confidence	☐	Low Confidence	☐				

10. If the pest needs a vector, is it present in the UK / PRA area?

A. spiraecola is a free living organism and does not need a vector.

11. How quickly could the pest spread in the UK / PRA area?

11.1 Natural spread: *A. spiraecola* could spread quickly, assessed with medium confidence due to uncertainty over the possible range of movement. While winged, adult aphids tend to disperse locally to suitable hosts (tens of metres), they are also capable of long range movement when carried by the wind (tens or hundreds of kilometres; Parry, 2013). *A. spiraecola* is likely to spread in this way: it was detected in all of southern Bulgaria within 10 years of its initial discovery (Andreev *et al.,* 2013) and became a major pest of *Citrus* within 3 years of appearing in Israel (Zehavi & Rosen, 1987). *A. spiraecola* produces winged forms in response to over-crowding. As populations are likely to build-up more slowly in the UK than further south in Europe, natural spread due to dispersal would be expected to be relatively slower.

11.2 In trade: *A. spiraecola* could spread quickly through trade in ornamental plants and orchard stock, a pathway believed to have introduced *A. spiraecola* to Bulgaria from Greece (Andreev *et al.,* 2013).

11.1 Natural spread	Very slowly	☐	Slowly	☐	Moderate pace	☐	**Quickly**	☑	Very quickly	☐
Confidence	High Confidence	☐	Medium Confidence	☑	Low Confidence	☐				
11.2 With trade	Very slowly	☐	Slowly	☐	Moderate pace	☐	**Quickly**	☑	Very quickly	☐
Confidence	High Confidence	☑	Medium Confidence	☐	Low Confidence	☐				

12. What is the pest's economic, environmental and social impact within its existing distribution?

12.1 Direct impact of feeding damage, outdoors: Direct impact is judged, with medium confidence, to be large on the main, economically important hosts grown outside. These are *Citrus* (citrus fruits – worldwide; CABI 2013), *Malus* (apple – North America, Far East and Europe; CABI 2013) and *Pyrus* (pear – China: Cao *et al*., 2012). It is difficult to be certain of the scale of impact because direct damage is not always differentiated from indirect effects (see below). *A. spiraecola* is reported from alpine yarrow (*Achillea collina*), grown for medicine, but damage has not yet been reported (Alps, Gama *et al*. 2010). As *Citrus* and alpine yarrow are not produced commercially in the UK, impacts to these hosts are not considered further. Similarly, *Pyrus* is not treated in detail because there is no evidence that it is a host in Europe and no information on scale of impact in China.

In Europe, apple is the main host of *A. spiraecola* in southern France (J-F Germain pers. comm.) and it is expanding as a pest of apple elsewhere (Hungary – Mezei & Kerekes, 2006; Serbia - Petrovic-Obradovic *et al*. 2009; Bulgaria - Andreev *et al.,* 2013); but it rarely occurs on apple in Turkey (Satar & Yugun, 2008). *A. spiraecola* is the most abundant aphid on apple in eastern N. America (Brown *et al.*, 1995), but it is only widespread in Virginia, West Virginia and Washington in the U.S. (CABI 2013).

Evaluating the impact of *A. spiraecola* is hindered by confusion with the related Green apple aphid, *A. pomi*, to which research has erroneously referred. However, the two species are considered to have a very similar ecology on apple (Brown et al., 1995) and broadly equivalent impacts (Kaakeh et al., 1993). Feeding damage on apple causes leaf curl and shoot distortion and it reduces the vigour of young, non-bearing trees (Kaakeh *et al*., 1993). Whether *A. spiraecola* causes an impact on fruit yield and quality depends on which apple variety is grown (Hamilton *et al*., 1986). High aphid densities can also exacerbate the effects of Apple blotch (*Alternaria alternate sensu lato*, at least under experimental conditions – Filajdić *et al*., 1995), which is present in the UK (CABI 2014).

In Bulgaria, where *A. spiraecola* was first detected on apple in 2007, combined populations of *A. pomi* and *A. spiraecola* exceeded the economic injury threshold (presence on 8-10% of shoots) in 10% of orchards. Otherwise, *A. spiraecola* usually infested less than 5% of shoots and colony density declined with altitude (Andreev *et al.*, 2013).

12.2 Direct impact of feeding damage, under protection: Although *A. spiraecola* occurs with other aphids on ornamentals outside, there is little evidence for impacts caused by this species on its own (Raupp *et al*., 1994). Similarly, under protection, *A. spiraecola* was found on ornamentals in less than 5% of permanent botanical collections and commercial nurseries in Bulgaria (Yovkova et al., 2013). As no further published information on impact under protection is available, it is judged to be small but with medium confidence.

12.1 Direct impacts - outdoors	Very small	☐	Small	☐	Medium	☐	**Large**	☑	Very large	☐

Confidence	High Confidence	☐	Medium Confidence	☑	Low Confidence	☐				
12.2 Direct impacts – under protection	Very small	☐	**Small**	☑	Medium	☐	Large	☐	Very large	☐
Confidence	High Confidence	☐	Medium Confidence	☑	Low Confidence	☐				

12.3 Indirect impact as a virus vector, outdoors: *Aphis spiraecola* has a very large indirect impact as it is the principal vector of the Citrus tristeza virus (CTV), in the main citrus-growing regions of the world, and this virus accounts for most damage to *Citrus* (CABI, 2013). *A. spiraecola* is also an important vector of Plum pox virus (PPV, Sharka disease; EPPO, 1994), which causes up to 75% yield loss in stone-fruit in south-east Europe and the USA (Wijkamp & van der Gaag, 2011).

12.4 Indirect impact as a virus vector, under protection: Although *A. spiraecola* can transmit a broad range of viruses (**see 14**), there is no specific information on its indirect impact under protection; therefore this is inferred to be small.

12.3 Indirect impacts - outdoors	Very small	☐	Small	☐	Medium	☐	Large	☐	**Very large**	☑
Confidence	High Confidence	☑	Medium Confidence	☐	Low Confidence	☐				
12.4 Indirect impacts – under protection	Very small	☐	**Small**	☑	Medium	☐	Large	☐	Very large	☐
Confidence	High Confidence	☐	Medium Confidence	☑	Low Confidence	☐				

13. What is the pest's potential to cause economic, environmental and social impacts in the UK / PRA area?

13.1 Direct impact of feeding damage in the UK: The likelihood of direct economic impact is considered small, both outside and under protection. Confidence is medium because information on damage by *A. spiraecola* on apple across Europe is limited. The likelihood for environmental and social impacts is assessed as very small due to the absence of information from anywhere in *A. spiraecola's* distribution.

A. spiraecola often occurs alongside *A. pomi* (green apple aphid) on apple, outside, in N. America and Europe. The reproductive potentials of *A. pomi* and *A. spiraecola* peak at 25˚C and 28˚C, respectively (Brown *et al.*, 1995). As *A. pomi* is currently only a minor pest of apple in the UK (HDC, 2014), this suggests that *A. spiraecola*'s potential to build-up populations and injure apple in the UK is low. This is corroborated by the aphid's distribution in northern France, where most records are from under glass and it is only known from apple in one department (pers. comm. J-F Germain, ANSES; Annex 1).

Under protection, *A. spiraecola* may occur occasionally on the following minor hosts: cucumber, lettuce and sweet pepper. Aphid populations could multiply rapidly on such hosts if they were able to gain entry, but breaks in cultivation would presumably prevent long-term establishment. There is no evidence that aphids are likely to persist on weeds during crop

breaks, as the main hosts are woody. Thus woody, ornamental plants in botanical collections under cover could be threatened, especially *Spiraea* and other Rosaceae. As for the assessment in 12.4, confidence is medium due to a lack of information.

13.2 Indirect impact as a virus vector in the UK: the indirect economic impact of *A. spiraecola* outside and under protection is considered small. Indirect environmental and social impacts are assessed very small, due to the absence of evidence from anywhere in *A. spiraecola's* distribution.

Plum Pox Virus (PPV) currently has a very low incidence in managed plum orchards in the UK (Mumford 2006). *A. spiraecola* would not pose additional risk as a vector because the very abundant *Myzus persicae* is already an important vector of PPV (Rothamsted Insect Survey, 2014). Similarly, *M. persicae* is a much more efficient vector than *A. spiraecola* of Potato Virus Y and the Bean common, Beet and Cucumber mosaic viruses - all present in the UK (DPV, 2014).

Blueberry scorch virus (BlScV) does not occur in the UK. *A. spiraecola* can transmit BlScV on commercial blueberry in North America (*Vaccinium* spp.; Lowery *et al*., 2008), but it has not been reported doing so in Europe (Pansa & Tavella, 2008) and is believed unimportant as a vector (van der Gaag *et al*., 2012).

13. Direct and indirect impacts, outdoors and under protection, in the UK:

Economic Impacts	Very small	☐	**Small**	✓	Medium	☐	Large	☐	Very large ☐
Confidence	High Confidence	☐	Medium Confidence	✓	Low Confidence	☐			
Environ - mental Impacts	**Very small**	✓	Small	☐	Medium	☐	Large	☐	Very large ☐
Confidence	High Confidence	☐	Medium Confidence	✓	Low Confidence	☐			
Social Impacts	**Very small**	✓	Small	☐	Medium	☐	Large	☐	Very large ☐
Confidence	High Confidence	☐	Medium Confidence	✓	Low Confidence	☐			

14. What is the pest's potential as a vector of plant pathogens?

Aphis spiraecola is recorded as a vector of approximately 20 plant viruses worldwide (Chan *et al*., 1991; see Annex 2), although it is likely to be able to transmit other, as yet undetected, viruses. Its impacts as a vector are summarised under 12b and 13b above.

15. What is the area endangered by the pest?

Southern England is endangered by *A. spiraecola* (especially urban areas), where the climate is warmer and where fruit orchards and woody ornamentals are widespread. Protected cultivation is at greater risk.

STAGE 3: PEST RISK MANAGEMENT

16. What are the risk management options for the UK/PRA area?

16a. Exclusion: Exclusion of *A. spiraecola* is unlikely because it can enter by natural spread from continental Europe. *A. spiraecola* would also be relatively difficult to exclude from trade because it occurs on a wide range of woody ornamentals and orchard trees; it would be difficult to detect unless infestations were heavy. As eggs are undetectable on primary hosts, trade in *Spiraea* and *Malus* would have to be certified as originating from pest free areas.

16b. Eradication / containment: If there was an outbreak of *A. spiraecola* outdoors, the chances of eradication or containment are likely to be low: *A. spiraecola* is likely to remain undetected until population levels become damaging, by which stage it is likely to have spread widely. There is potential for the pest to establish on wild and ornamental rosaceous hosts in hedgerows and gardens, such as hawthorn (*Crataegus monogyna*) and apple (*Malus)*. The chances of eradication or containment would be greater indoors as specific hosts could be targeted for treatment or destruction.

16c. Non–statutory control: If *A. spiraecola* became established and was not under statutory measures, it could be controlled via monitoring in relation to the economic injury threshold and applying selective insecticides when necessary. Practically, such control would be applied to mixed infestations of *A. pomi* and *A. spiraecola*, because they are indistinguishable in the field.

17. Summary and conclusions of the rapid PRA.

Aphis spiraecola is a major, worldwide pest and virus vector on citrus and certain orchard fruit. In the 2000s it has spread through south-east Europe and has entered the UK occasionally in the plant trade. It has occurred in the UK as single, transient colonies in 1996 and 2007. The status of *A. spiraecola* in the UK would be clarified through monitoring. *A. spiraecola* may establish on apple, woody ornamental shrubs and in protected cultivation. There is uncertainty as to whether populations could build up enough to cause limited damage. Outbreaks under protection could be controlled by eradication, but this is unlikely to be feasible outdoors. This rapid assessment shows that:

Risk of entry is likely on live plants moved in trade, especially young orchard stock and woody ornamental plants; and moderately likely by natural spread because aphids are effective aerial dispersers and *A. spiraecola* has occurred in suction trap samples in northern France and Belgium.

Risk of establishment is moderately likely outdoors, as *A. spiraecola's* primary and secondary hosts are common and widespread. Although *A. spiraecola* is present in warm, temperate parts of the world, it is only locally established in northern Europe and transient colonies have occurred in the UK twice. *A. spiraecola* is likely to establish indoors because both major and minor hosts are available. Early infestations are unlikely to be detected and temperatures are favourable for development. Under protection, colonies are more likely to persist on woody ornamentals than horticultural crops because the latter undergo annual cultivation with renewal of stock.

Spread is likely to be quick because winged adults can move long distances in the wind and eggs and nymphs could be moved unnoticed in trade, on ornamental plants and orchard stock.

Economic impact in the UK, via direct feeding damage and as a virus vector, outside and under protection, is likely to be small. Although dessert and cider apple orchards are major outdoor crops, *A. spiraecola* is unlikely to build up damaging populations. Concerning plums and potatoes, injurious viruses are already transmitted more effectively by other aphids. Under protection, horticultural crops and woody shrubs in botanical collections or nurseries are also at risk. However, damage in such environments is likely to be limited by annual cultivation and / or the option of insecticidal control.

Endangered area is principally orchards in southern England and urban areas, where the highest summer temperatures occur, and in protected cultivation.

Risk management: Due to the wide range of hosts moved in trade and the likely entry by natural spread, the risk posed by *A. spiraecola* would be managed best through broad scale surveillance (aerial suction trap samples), targeted monitoring of key crops and eradication of outbreaks under protection.

Uncertainty

1. Further research on the possible presence of *A. spiraecola* in aerial samples from the Rothamsted Insect Survey would reduce uncertainty over a) its status in the UK and b) likelihood of establishment.
2. Further research on its local distribution in northern Europe (especially Belgium and the Netherlands) would reduce uncertainty over its likelihood of entry by natural spread.

18. Is there a need for a detailed PRA or for more detailed analysis of particular sections of the PRA? If yes, select the PRA area (UK or EU) and the PRA scheme (UK or EPPO) to be used.
(For completion by the Plant Health Risk Group) ✓ *(put a tick in the box)*

No	✓

Yes		PRA area: UK or EU		PRA scheme: UK or EPPO	

19. IMAGES OF THE PEST

Aphis spiraecola Patch	*Photo 2 (e.g. symptoms?)*
	
Source/ © A Jensen https://www.flickr.com/photos/sandnine/	*Source/ copyright owner*

For a range of images, see: http://aphid.aphidnet.org/Aphis spiraecola.php

20. Given the information assembled within the time scale required, is statutory action considered appropriate / justified?
[*For completion by the Plant Health Risk Group*] *(put a tick in the box)*

Yes Statutory action		No Statutory action	✓

21. Acknowledgements

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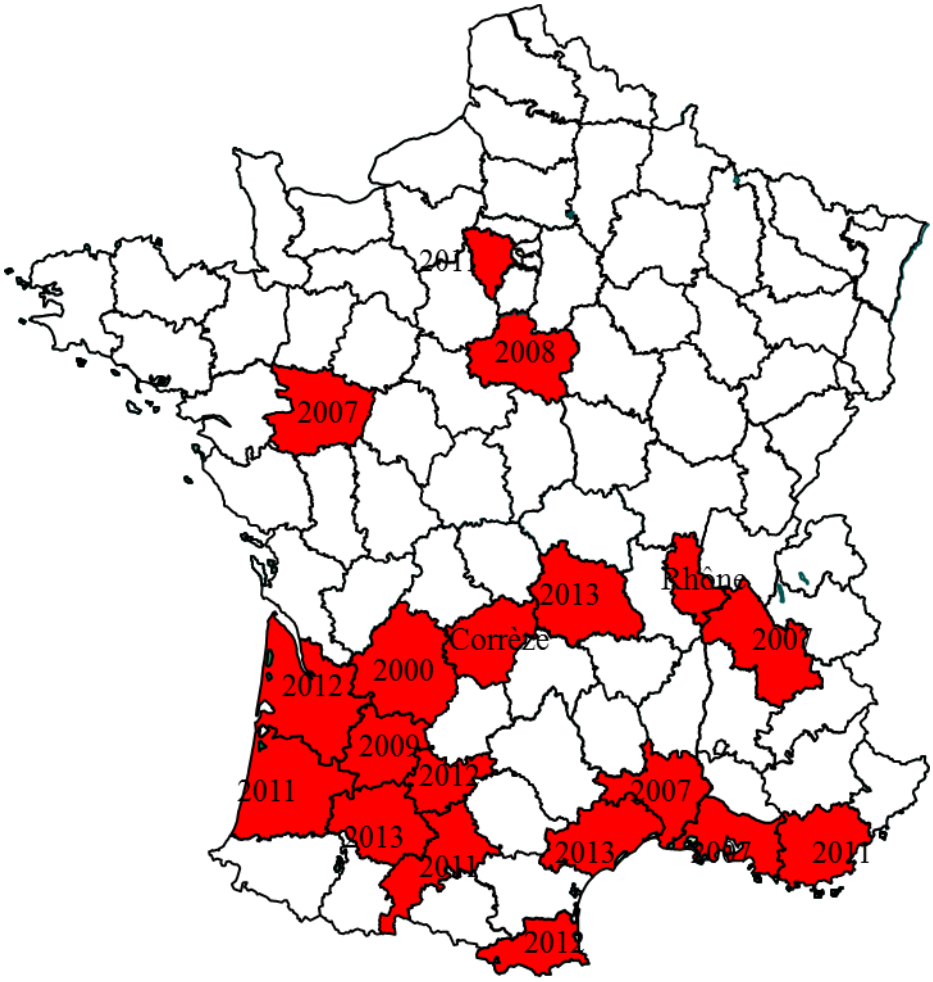
Annex 1 – Distribution of *Aphis spiraecola* Patch in administrative departments of mainland France (source: 'LSV Unité Entomologie et Plantes Invasives' database, pers. comm. J-F Germain).

Year labels show when *A. spiraecola* was last recorded. In northern France, *A. spiraecola* is only recorded under glass on ornamentals (2011- Yvelines, 2008 – Loiret) or outdoors on apple (2007 – Maine et Loire). In southern France, *A. spiraecola* mainly occurs on apple, but is also found on other Rosaceae, citrus and *Nerium oleander* outdoors.



Annex 2. Viruses transmitted by *Aphis spiraecola* Patch.

Sources of information on virus distribution and transmission (accessed on 10 Sep 2014):

- *Descriptions of Plant Viruses* http://www.dpvweb.net/index.php;
- Brunt AA, Crabtree K, Dallwitz MJ, Gibbs AJ, Watson L & Zurcher EJ (eds.) (1996 onwards). `Plant Viruses Online: Descriptions and Lists from the VIDE Database. Version: 20th August 1996.' http://biology.anu.edu.au/Groups/MES/vide/ ;
- CABI (2014) *Crop Protection Compendium*, http://www.cabi.org/cpc/
- Virus taxonomy follows the International Committee on Taxonomy of Viruses (2013). http://www.ictvonline.org/index.asp

Virus	Economic hosts	Virus present in UK?	Virus present in EU?	Equally or more efficient vectors present in UK?
Alfalfa mosaic virus	-	yes*	yes	- (* few occurrences)
Bean common mosaic virus	*Leguminosae*	yes	yes	yes
Beet mosaic virus	*Beta vulgaris*	yes	yes	yes
Cucumber mosaic virus	*Cucurbitaceae, Solanaceae*	yes	yes	yes
Plum pox virus	*Prunus*	yes	yes	yes
Potato virus Y	*Solanum tuberosum*	yes	yes	yes
Zucchini yellow mosaic virus	*Cucurbitaceae*	yes	yes	yes
Blueberry scorch virus	*Vaccinium*	no	yes	Unknown (*A. spiraecola* transmits the virus in North America but not in Europe)
Citrus tristeza virus	-	no	yes	no
Citrus psorosis virus	-	no	yes	no
Watermelon mosaic virus	-	no	yes	yes
Araujia mosaic virus	-	no	no	-
Bidens mottle virus	-	no	no	-
Carrot virus Y	-	no	no	-
Papaya ringspot virus	-	no	no	-
Passiflora ringspot virus	-	no	no	-
Peanut stunt virus	-	no	no	-
Pepper veinal mottle virus	-	no	no	
Telfairia mosaic virus	-	no	no	-