



Quick scan for *Hishimonus sellatus*

National Plant Protection Organization, the Netherlands

Quick scan number: QS2025ENT003

Quick scan date: 01-09-2025

No.	Question	Quick scan answer for <i>Hishimonus sellatus</i>
1.	What is the scientific name (if possible up to species level + author, also include (sub)family and order) and English/common name of the organism? <i>Add picture of organism/damage if available and publication allowed.</i>	Order: Hemiptera Family: Cicadellidae Subfamily: Deltocephalinae Species: <i>Hishimonus sellatus</i> (Uhler, 1896) English/common name: not available
2.	What prompted this quick scan? <i>Organism detected in produce for import, export, in cultivation, nature, mentioned in publications, e.g. EPPO alert list, etc.</i>	A total of 40 specimens of <i>H. sellatus</i> were found on six yellow sticky traps in a commercial glasshouse in the Netherlands.
3.	What is the risk assessment area?	The risk assessment area is the territory of the European Union (EU 27).
4.	What is the current area of distribution?	Asia: China (Anhui, Fujian, Guizhou, Henan, Hongkong, Hubei, Hunan, Jiangsu, Jiangxi, Liaoning, Ningxia, Shandong, Shaanxi, Shanxi, Sichuan, Taiwan, Xinjiang, Zhejiang), Afghanistan, Armenia, Georgia, India, Indonesia, Japan, Korea, Malaysia, Philippines, Russia, Sri Lanka Oceania: Australia, Papua New Guinea Africa: Ethiopia, Tanzania North America: USA (Boston). (Du & Dai 2019, iNaturalist 2025) The species originates in Eastern Asia and had been introduced into other parts of the world (Bella <i>et al.</i> , 2022).

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5.	What are the host plants?	<i>Hishimonus sellatus</i> is a polyphagous species feeding on species of many plant families. Reported hosts include <i>Ampelopsis brevipedunculata</i> var. <i>heterophylla</i> , <i>Boehmeria nivea</i> , <i>Catharanthus roseus</i> , <i>Cudrania tricuspidata</i> , <i>Daucus carota</i> , <i>Humulus japonicus</i> , <i>Ligustrum obtusifolium</i> , <i>Lycium chinense</i> , <i>Morus alba</i> , <i>Oryza sativa</i> , <i>Rosa rugosa</i> , <i>Rosa</i> sp., <i>Solanum melongena</i> , <i>Vitex rotundifolia</i> , <i>Ziziphus jujuba</i> (Bella et al. 2022, Hao et al. 2015, Kim & Kim 1993, Kim et al. 2024).
6.	Does the organism cause any kind of plant damage in the current area of distribution and/or does the consignment demonstrate damage suspected to have been caused by this organism? <i>Yes/no + plant species on which damage has been reported + short description of symptoms.</i> <i>Please indicate also when the organism is otherwise harmful (e.g. predator, human/veterinary pathogen vector, etc.).</i>	There are no records of direct feeding-damage by <i>H. sellatus</i> . However, the species is known to be a major vector of strains of ' <i>Candidatus</i> Phytoplasma ziziphi' (of which the reference strain is an EU quarantine pest, i.e. listed in Annex II of Implementing Regulation (EU) 2019/2072), and of ' <i>Candidatus</i> Phytoplasma asteris'. Transmission of the following diseases, caused by these phytoplasmas, by <i>H. sellatus</i> has been reported: <ul style="list-style-type: none"> • Jujube witches' broom ('<i>Ca. P. ziziphi</i>', Han & Cha 2002) • Hovenia witches' broom ('<i>Ca. P. ziziphi</i>', Kusunoki et al. 2002, Kamala-Kannan et al., 2011) • Mulberry dwarf ('<i>Ca. P. asteris</i>', Han & Cha 2002) • Cryptotaenia japonica witches' broom ('<i>Ca. P. asteris</i>', Nishimura et al. 2013) • Onion yellows ('<i>Ca. P. asteris</i>', Nishimura et al. 2013) • Rhus Yellows ('<i>Ca. P. asteris</i>', Kusunoki et al. 2002, Cai et al. 2017) ' <i>Ca. P. ziziphi</i> ' is regulated as an EU quarantine pest because it is known to cause diseases in <i>Malus</i> and <i>Prunus</i> (EFSA Panel on Plant Health et al., 2020). ' <i>Ca. Phytoplasma asteris</i> ' is present in the EU where it is a Regulated Non Quarantine Pest for planting of <i>Fragaria</i> and <i>Vaccinium</i> (Annex IV, Implementing Regulation (EU) 2019/2072).
7.	Assess the probability of establishment in the Netherlands (NL) (i.e. the suitability of the environment for establishment). a. In greenhouses b. Outdoors c. Otherwise (e.g. storage facilities, human environment)	<u>Greenhouses</u> <i>H. sellatus</i> is not known as a greenhouse pest. However, as a polyphagous species, this species can likely establish in greenhouses when host plants are available yearround. <u>Outdoors</u> Optimal development parameters are not known for <i>H. sellatus</i> . Its known distribution is mostly (sub)tropical but the species is also found in more continental climates with cold winters (Du & Dai 2019; iNaturalist 2025). In its original distribution area (eastern Asia), the species has a similar distribution as <i>H. hamatus</i> which was first found in Europe in 2012 and has since spread over southern, central and western Europe, including the Netherlands in recent years (De Haas et al. 2025). <i>H. sellatus</i> was introduced to the Boston area and can survive the cold winters there (PPQ 2023). It is, therefore, likely that it can establish in large parts of the EU including NL.
8.	Assess the probability of establishment in the EU (i.e. the suitability of the environment for establishment).	<i>H. sellatus</i> can likely establish in large parts of the EU (see Q7).
9.	What are the possible pathways that can contribute to spread of the organism after introduction? How rapid is the organism expected to spread (by natural dispersal and human activity)?	Adults of <i>H. sellatus</i> can fly, although no data are available on the dispersal distances of <i>H. sellatus</i> . The species can also spread by movement of infested plants and possible also by hitchhiking on vehicles.

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		Two <i>Hishimonus</i> species (<i>H. hamatus</i> and <i>H. diffractus</i>) have shown to be able to spread over large areas of Europe, both through natural dispersal after initial introduction as well as through plant trade (Bella <i>et al.</i> 2022).
10.	Provide an assessment of the type and amount of direct and indirect damage (e.g. lower quality, lower production, export restrictions, threat to biodiversity, etc.) likely to occur if the organism would become established in NL and the EU, respectively?	<p>Damage (especially) occurs when the species vectors plant diseases which may reduce yields in fruit-bearing species or reduce the marketability of ornamental plants. It is especially known as a vector of '<i>Ca. Phytoplasma asteris</i>' and '<i>Ca. Phytoplasma ziziphi</i>' (see also Q6):</p> <ul style="list-style-type: none"> • '<i>Candidatus Phytoplasma asteris</i>' is already present in many EU Member States including NL and can also be vectored by other insect species.' Uncertainty: introduction of <i>H. sellatus</i> may increase the impact of '<i>Ca. Phytoplasma asteris</i>' as it may spread the phytoplasma (efficiently) to host plants to which the vector species currently present do not spread the phytoplasma (efficiently). • '<i>Candidatus Phytoplasma ziziphi</i>' (reference strain) is an EU quarantine species that causes widespread yield losses in jujube plants in China and is regulated in the EU because of reported damage in <i>Malus</i> and <i>Prunus</i> (EFSA Panel on Plant Health <i>et al.</i>, 2020). Disease symptoms have been reported in fruit trees of <i>Malus</i> and <i>Prunus</i> including little leaf, branches with shortened internodes, witches' broom, wilting and dying of trees caused by '<i>Ca. Phytoplasma ziziphi</i>' - strains (Li <i>et al.</i>, 2014; Wang <i>et al.</i>, 2014; Gao <i>et al.</i>, 2020; Thakur <i>et al.</i>, 2025a). Wang <i>et al.</i> (2014) observed symptomatic trees in two orchards and Gao <i>et al.</i> (2020) mention two symptomatic trees in each of two orchards in China. Thakur <i>et al.</i> (2025b) report poor fruit set and 'drastically reduced yields' in plum orchards (<i>P. domestica</i>) in India caused by a '<i>Ca. Phytoplasma ziziphi</i>' - related strain; the 'disease prevalence' was 50-55% during spring increasing to 70% in late summer and autumn. '<i>Ca. P. ziziphi</i>' has a wide host range (Guo <i>et al.</i> 2023) and may also be pathogenic on other plant species (uncertainty). <p>Notes on vector transmission</p> <p>Numerous phytoplasmas are transmitted by multiple insect species (Weintraub & Beanland, 2006). For example, many Cicadellidae are known to vector '<i>Ca. P. asteris</i>' (Marcone, 2022). The known vector lists are often considered incomplete because transmission experiments are difficult since phytoplasmas are non-culturable and not artificially transmissible. As such, there is a high uncertainty regarding the potential vectors of '<i>Ca. P. ziziphi</i>' with several Cicadellidae (<i>Hishimonoides chinese</i>, <i>Hishimonoides aurifacialis</i>, and <i>Typhlocyba</i> sp.) documented as vectors of this disease on <i>Ziziphus jujuba</i> (PPQ, 2023 and references therein). Liu <i>et al.</i> (2023) reported <i>Hishimonus hamatus</i> as a vector but direct data on their transmission experiments is lacking. <i>Hishimonus hamatus</i> is already present in the EU but none of the known vectors of '<i>Ca. P. ziziphi</i>' have been reported thus far in the EU.</p>

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11.	Has the organism been detected on/in a product other than plants for planting (e.g. cut flowers, fruit, vegetables)? <i>If "no", go to question 13</i>	No
12.	If the organism has been found on/in a product other than plants for planting (e.g. cut flowers, fruit, vegetables), what is the probability of introduction (entry + establishment)? <i>Only to be answered in case of an interception or a find.</i>	-
13.	Additional remarks	<p>Once <i>H. sellatus</i> is established, the species is expected to be difficult to eradicate because:</p> <ul style="list-style-type: none"> - the species is polyphagous; - adults can easily disperse by flying and movement of infested plants. <p>Another <i>Hishimonus</i> species, <i>H. phycitis</i> is regulated in the EU (listed in Annex II of Implementing Regulation (EU) 2019/2072) mainly because of its ability to transmit various phytoplasmas (EFSA Panel on Plant Health <i>et al.</i>, 2017).</p>
14.	Summary and conclusions	<ul style="list-style-type: none"> • This Quicksan was prompted by the finding of <i>Hishimonus sellatus</i> in commercial glasshouse in the Netherlands. • <i>Hishimonus sellatus</i> is not known to be present in the EU and is (currently) not regulated in the EU. • <i>Hishimonus sellatus</i> can likely establish in large parts of the EU. • <i>Hishimonus sellatus</i> is not known as a plant pest, but is a vector of the EU-quarantine pest 'Candidatus Phytoplasma ziziphi' (reference strain). • If <i>H. sellatus</i> were to become established in the EU, it is expected to increase the potential impact of 'Ca. Phytoplasma ziziphi' by acting as a vector of the phytoplasma.
15.	References	<p>Bella S, Aguín-Pombo D, Aguiar AMF, Kunz G, Miralles-Núñez A, Foster S, Sánchez-García I, Wilson MR & D'Urso V 2022. Discovery of <i>Hishimonus diffractus</i> Dai, Fletcher & Zhang, 2013 (Hemiptera: Auchenorrhyncha: Cicadellidae) in Europe, with remarks on previously recorded species of the genus. <i>Zootaxa</i> 5159(4): 558-570.</p> <p>Cai, S., Chen, J. Y., Song, D. Y., Hong, C. H., Zha, Y. P., Zhang, Z. Y., ... & Hong, N. (2017). First Report of 'Candidatus Phytoplasma asteris' Causing Witches'-Broom Disease on Chinese Sumac (<i>Rhus chinensis</i>) in China. <i>Plant Disease</i>, 101(7), 1315.</p> <p>De Haas MC, Den Bieman CFM, Jansen RPh, Lommen G, Martens T, Van de Meulengraaf B & Verbeek M 2025. Four leafhoppers new for the Dutch fauna (Auchenorrhyncha: Cicadomorpha: Cicadellidae). <i>Entomologische Berichte</i> 85(2): 61-65.</p> <p>Du L & Dai W 2019. High species diversity of the leafhopper genus <i>Hishimonus</i> Ishihara (Hemiptera: Cicadellidae: Deltocephalinae) from China, with description of ten new species. <i>Insects</i> 10(5): 1-52.</p> <p>EFSA Panel on Plant Health, Jeger M, Bragard C, Caffier D, Candresse T, Chatzivassiliou E, Dehnen-Schmutz K, Gilioli G, Gregoire JC & Jaques Miret JA, 2017. Pest categorisation of <i>Hishimonus phycitis</i>. <i>EFSA Journal</i>, 15 (10), e05037.</p>

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		<p>EFSA Panel on Plant Health, Bragard C, Dehnen-Schmutz K, Gonthier P, Jaques Miret JA, Justesen AF, MacLeod A, Magnusson CS, Milonas P, Navas-Cortes JA, Parnell S, Potting R, Reignault PL, Thulke H-H, Van der Werf W, Civera AV, Yuen J, Zappalà L, Bosco D, Chiumenti M, Di Serio F, Galetto L, Marzachi C, Pautasso M & Jacques M-A, 2020. Pest categorisation of the non-EU phytoplasmas of <i>Cydonia</i> Mill., <i>Fragaria</i> L., <i>Malus</i> Mill., <i>Prunus</i> L., <i>Pyrus</i> L., <i>Ribes</i> L., <i>Rubus</i> L. and <i>Vitis</i> L. EFSA Journal, 18 (1), e05929. Available online: https://doi.org/10.2903/j.efsa.2020.5929</p> <p>Gao R, Yang SK, Yan HH, Wang J, Wang HY & Lu XB, 2020. First Report of 'Candidatus Phytoplasma ziziphi' Subgroup 16SrV-B Associated with <i>Prunus salicina</i> Witches'-Broom in China. <i>Plant Disease</i>, 104 (2), 564. Beschikbaar online: https://doi.org/http://dx.doi.org/10.1094/PDIS-06-19-1259-PDN</p> <p>Guo S, Gu L, Zhang Y, Wu Y, Tan B, <i>et al.</i> 2023. Jujube witches' broom ('Zaofeng') disease: bacteria that drive the plants crazy. <i>Fruit Research</i> 3:35 doi: 10.48130/FruRes-2023-0035</p> <p>Han S & Cha B 2002. Genetic similarity between Jujube Witches' Broom and Mulberry Dwarf Phytoplasmas transmitted by <i>Hishimonus sellatus</i> Uhler. <i>Plant Pathol. J.</i> 18: 98–101.</p> <p>iNaturalist 2025. Observations of <i>Hishimonus sellatus</i>, Available from: https://www.inaturalist.org/taxa/475147-Hishimonus-sellatus. Accessed on 18 August 2025.</p> <p>Kamala-Kannan, S., Han, S. S., Lee, K. J., Velmurugan, P., Lee, Y. H., Chae, J. C., ... & Oh, B. T. (2011). Association of elm yellows subgroup 16SrV-B phytoplasma with a disease of <i>Hovenia dulcis</i>. <i>Journal of Phytopathology</i>, 159(3), 171-174.</p> <p>Kim E, Kim I-K, Oh S & Jung S 2024. Taxonomic review of the genus <i>Hishimonus</i> Ishihara (Hemiptera: Auchenorrhyncha: Cicadellidae: Deltocephalinae) from Korea. <i>Journal of Asia-Pacific Biodiversity</i> 17(4): 760-763.</p> <p>Kim KC & Kim MS 1993. Host range and Bionomics of the Rhombic Marked Leafhopper, <i>Hishimonus sellatus</i> Uhler(Homoptera: Cicadellidae) as a Vector of the Jujube Witches'-Broom Mycoplasma. <i>Korean journal of applied entomology</i> 32(3): 338-347.</p> <p>Kim YH, La J and Kim YT 1985. Transmission and histochemical detection of mulberry dwarf mycoplasma in several herbaceous plants. <i>Korean Journal of Plant Pathology</i>, 1: 184-189</p> <p>Kusunoki M, Shimoi T, Kobayashi M, Okudaira T & Nohira T 2002. A leafhopper (<i>Hishimonus sellatus</i>) transmits phylogenetically distant phytoplasmas: <i>Rhus</i> yellows and <i>Hovenia</i> witches' broom phytoplasma. <i>J. Gen. Plant Pathol.</i> 68: 147–154.</p> <p>Liu, R. C., Li, B. L., Chen, X. L., Liu, J. J., Luo, K., & Li, G. W. (2023). 'Candidatus Phytoplasma ziziphi' Changes the Metabolite Composition of Jujube Tree Leaves and Affects the Feeding Behavior of Its Insect Vector <i>Hishimonus hamatus</i> Kuoh. <i>Insects</i>, 14(9), 750.</p> <p>Li ZN, Bai YB, Liu P, Zhang L & Wu YF, 2014. Occurrence of 'Candidatus Phytoplasma ziziphi' in apple trees in China. <i>Forest Pathology</i>, 44 (5), 417-419.</p>

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		<p>Nishimura N, Nakajima & S Sawayanagi, T 2013. Transmission of <i>Cryptotaenia japonica</i> witches' broom and onion yellows phytoplasmas by <i>Hishimonus sellatus</i> Uhler. Japan. J. Phytopathol. 64: 474-477.</p> <p>Marcone C 2022. Candidatus Phytoplasma asteris (yellow disease phytoplasmas). CABI Compendium. CABI Compendium. https://doi.org/10.1079/cabicompendium.7642</p> <p>PPQ 2023. Cooperative Agricultural Pest Survey (CAPS) Pest Datasheet for 'Candidatus Phytoplasma ziziphi' (Achleplasmataceae): Jujube witches' broom phytoplasma. United States Department of Agriculture, Animal and Plant Health Inspection Service, Plant Protection and Quarantine (PPQ), Raleigh, NC.</p> <p>Thakur A, Handa A & Chauhan A, 2025a. Emerging Phytoplasma threat: plum orchards under siege in Himachal Pradesh, India. Phytopathogenic Mollicutes, 15 (1), 107-108. Beschikbaar online: https://doi.org/https://dx.doi.org/10.5958/2249-4677.2025.00057.7</p> <p>Thakur A, Handa A, Gupta B & Chauhan A, 2025b. First report of 'Candidatus Phytoplasma ziziphi' subgroup 16SrV-B related strain associated with plum (<i>Prunus domestica</i>) in India. New Disease Reports, 52 (1), e70042.</p> <p>Wang J, Zhu D, Liu Q, Davis R & Zhao Y, 2014. First report of sweet cherry virescence disease in China and its association with infection by a 'Candidatus Phytoplasma ziziphi'-related strain. Plant Disease, 98 (3), 419-419.</p> <p>Weintraub PG & Beanland L, 2006. Insect vectors of phytoplasmas. Annual Review of Entomology, 51 (1), 91-111.</p>
16.	Follow-up measures	<p>A survey has been conducted in the vicinity of the infested glasshouse during which no specimens of <i>H. sellatus</i> were found. The species is not considered to be established outdoors in the Netherlands. Official measures will be taken to eradicate <i>H. sellatus</i> from the glasshouse and the organism will be considered 'Q-waardig' in the Netherlands.</p>