Plant Risk Evaluator -- PRE™
Evaluation Report

Senecio angustifolius -- California

2022 Western IPM Grant Project

PRE Score: 13 -- Moderate Potential Risk
Confidence: 70 / 100
Questions answered: 20 of 20 -- Valid (80% or more questions answered)

Privacy: Public
Status: Completed

Evaluation Date: November 6, 2022

This PDF was created on May 23, 2025

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Plant Evaluated

Senecio angustifolius

Image by Ron Vanderhoff

Evaluation Overview

A PRE™ screener conducted a literature review for this plant (*Senecio angustifolius*) in an effort to understand the invasive history, reproductive strategies, and the impact, if any, on the region's native plants and animals. This research reflects the data available at the time this evaluation was conducted.

Summary

Senecio angustifolius (syn. Jacobaea angustifolia) is a perennial, semi-woody shrublet to ca 1m tall and slightly wider, an Asteraceae native to South Africa. It was first documented and collected in the United States in the North coastal San Diego area in 2010, but misidentified as Senecio quadridentatus. Following a 2018 Orange County collection, the taxonomy of these California plants was questioned. After queries with Australian and African taxonomists these California plants were redetermined by Dr. Miranda Koekemoer (South African National Biodiversity Institute, Pretoria), as this taxon. Similar plants both observed and collected in the Santa Barbara area and North Channel Islands (Santa Cruz Island) remain as S. quadridentatus. The extent of the current California invasion is still uncertain. In California the plant has been documented from near sea level (5 m) to 482 meters. Habitat ranges from ephemeral stony, cobbly or sandy washes in coastal sage scrub or riparian edge communities, but is also reported in adjacent dry slopes and riparian edge plant communities. It often occurs in upper alluvium or old benches of washes.The species is currently under some level of management in most or all known CA locations. In California the known populations are rather widely scattered, with San Diego populations separated from Orange County populations by 20 miles. Within the San Diego occurrences, populations are as much as 5-10 miles separated, and in Orange County they are separated by 2 miles. I'd add in the description that the population on Pendleton and the OC population are separated by 20 miles. And then within those two clusters the Pendleton population contains individuals that are 5-10 miles separated, and the OC population is 2 miles wide. The question asks if long-distance dispersal is "frequent", which this doesn't seem to be frequent dispersal, but it certainly is happening, and quite possibly via people, clothes or footwear. There is a scarcity of published information about this species, especially its invasiveness, has resulted in a low confidence score. Outside of weediness outside of its native range in South Africa, California appears to be the only current location of invasiveness.

General Information

Status: Completed
Screener: Ron Vanderhoff
Evaluation Date: November 6, 2022

Plant Information

Plant: *Senecio angustifolius*

Regional Information

Region Name: California

Climate Matching Map

To answer four of the PRE questions for a regional evaluation, a climate map with three climate data layers (Precipitation, UN EcoZones, and Plant Hardiness) is needed. These maps were built using a toolkit created in collaboration with GreenInfo Network, USDA, PlantRight, California Invasive Plant Council, and The Information Center for the Environment at UC Davis.

Click here to see the generated climate matching map for this region. This climate match database is hosted by GreenInfo Network and publicly accessible.

Evaluation Questions

These questions are based on an article published by PLOS One, which can be found here: https://doi.org/10.1371/journal.pone.0121053.

Invasive History and Climate Matching (Questions 1 - 6)

1. Has the species (or cultivar or variety, if applicable; applies to subsequent "species" questions) become naturalized where it is not native?

- Answer: **Yes**, which contributes **1** point(s) to the total PRE score.
- The *screener* has a **High** confidence in this answer based on the available literature.

Answer / Justification:

The species is now well established at widely scattered locations in the North San Diego area (USMC Camp Pendleton) and at 1-3 locations in Orange County. (Calflora & CCH2) The species has established in agricultural rooibos tea (Aspalathus linearis) plantations in South Africa slightly North and West of its native range. Although possibly only an agricultural weed here, I am including these South African occurrences as "where it is not native". (Senecio angustifolius as the major source . . .) iNaturalist shows no occurrences outside of South Africa, other than those in California. (iNaturalist) Outside of its native range in South Africa, there dubious records from Mexico, Germany, Spain and Taiwan, which are all considered to be in error and are ignored in this assessment. For a discussion of these, please see the "Notes" at the end of this assessment Other than California and in tea plantations outside its native South African range (and unlikely in Mexico, Germany, Spain or Taiwan), I could find no other documentation of the species naturalizing. The species is referenced as a common "weed" in tea plantations adjacent to but outside its native South African range. (Senecio a. - rooibos tea)

Reference(s):

- GBIF Secretariat (2022). GBIF Backbone Taxonomy. Checklist dataset https://doi.org/10.15468/39omei accessed via GBIF.org on 09-2022.
- Calflora (2022). Observation Search - Senecio angustifolius.
- Raza-Zarate, R. (2019). Laurel Regeneration in the Presence of Disturbance Events: A Case Study. Forest Science. 2019(December),
- Van Wyk, B.E., Stander M.A., & Long H.S. (2017). Senecio angustifolius as the major source of pyrrolizidine alkaloid contamination of rooibos tea (Aspalathus linearis). South African Journal of Botany. 110, 124-131.
- iNaturalist (2022). iNaturalist observations: Senecio angustifolius.
- SWINet Portal Network (2022). SEINet Portal Network Collections Search Results accessed 9-2022.
- CCH2 Portal (2022). CCH2 Portal Collections Results for Senecio angustifolia accessed 9-2022.

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2. Is the species (or cultivar or variety) noted as being naturalized in the US or world in a similar climate?

- Answer: **Yes**, which contributes **2** point(s) to the total PRE score.
- The *screener* has a **High** confidence in this answer based on the available literature.

Answer / Justification:

The species is now well established at widely scattered locations in the North San Diego area (USMC Camp Pendleton) and at 1-3 locations in Orange County. (Calflora, CCH2, and Simpson, et al) Outside of its native range in South Africa, occurrences on GBIF from Mexico, Germany, Spain and Taiwan are all likely in error and omitted. See the "Notes" section for further discussion. The species has established in agricultural tea plantations in South Africa slightly North and West of its native range. Although possibly only an agricultural weed here, I am including these South African occurrences as "naturalized in a similar climate". (Senecio a. - rooibos tea) iNaturalist shows no occurrences outside of South Africa, other than those in California. (iNaturalist) Other than California and in tea plantations outside its native South African range, I could find no documentation of the species naturalizing. However, the species is referenced as a common "weed" in tea plantations outside but adjacent to its native South African range. A Climate Match SHOULD include plants that have naturalized, even in a horticultural or agricultural environment (although not necessarily invasive). Because of it being naturalized outside of its native range in South Africa, this question must be answered as a "YES".

Reference(s):

- Calflora (2022). Observation Search - Senecio angustifolius.
- Van Wyk, B.E., Stander M.A., & Long H.S. (2017). Senecio angustifolius as the major source of pyrrolizidine alkaloid contamination of rooibos tea (Aspalathus linearis). South African Journal of Botany. 110, 124-131.
- GBIF Secretariat (2022). GBIF Backbone Taxonomy. Checklist dataset https://doi.org/10.15468/39omei accessed via GBIF.org on 09-2022.
- iNaturalist (2022). iNaturalist observations: Senecio angustifolius.
- CCH2 Portal (2022). CCH2 Portal Collections Results for Senecio angustifolia accessed 9-2022.
- Simpson, M. S., & Vanderhoff R. (2022). Taxonomic Identity of a Recently Naturalized Senecio Species in California. Madrono. 69(3),

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3. Is the species (or cultivar or variety) noted as being invasive in the U.S. or world?

- Answer: **No**, which contributes **0** point(s) to the total PRE score.
- The *screener* has a **Medium** confidence in this answer based on the available literature.

Answer / Justification:

The species is now well established at widely scattered locations in the North San Diego area at USMC Camp Pendleton, and at 1-3 locations in Orange County. (Calflora & CCH2) At USMC Camp Pendleton it is rather well established. Brief conversations with Jon Rebman, San Diego Natural History Museum (J. Rebman, pers. comm.) and one of the Pendleton staff biologists who is working on the management. There is certainly concern on their part, but there is no public documentation as yet. There are now at least nine populations (each separated by at least 2 km) and it has spread over several kilometers and through at least four different watersheds. It has certainly naturalized there and it's footprint is expanding. However, it's environmental impacts at USMC Pendleton are not yet likely understood or quantified since it has only been on the site for perhaps little over a decade. The species has established in agricultural tea plantations in South Africa slightly North and West of its native range. Although possibly only an agricultural weed here, I am including these South African occurrences as "being invasive". (Senecio a. - rooibos tea) Outside of its native range in South Africa, occurrences on GBIF from Mexico, Germany, Spain and Taiwan are all likely in error and omitted. See the "Notes" section for further discussion. (GBIF) (Forest Science) (SEINet) iNaturalist shows no occurrences outside of South Africa, other than those in California. (iNaturalist) Other than California and in tea plantations outside its native South African range (and likely misidentifications in Mexico), I could find no documentation of the species naturalizing. However, the species is referenced as a common "weed" in tea plantations adjacent to its native South African range. In summary, "Invasiveness", as defined by PRE, is not thoroughly established here, at least not yet. Based on the PRE definition of "invasive", this question must be answered as a "NO".

Reference(s):

- Razo-Zárate, R., Retama-Cázares L. Berenice, Rodríguez-Laguna R., Palacios-Romero A., Meza-Rangel J., Capulín-Grande J., et al. (2019). Laurel (Litsea glaucescens Kunth) Regeneration in the Presence of Disturbance Events: A Case Study. Forest Science. 65, 688–692.
- Calflora (2022). Observation Search - Senecio angustifolius.
- SWINet Portal Network (2022). SEINet Portal Network Collections Search Results accessed 9-2022.
- Van Wyk, B.E., Stander M.A., & Long H.S. (2017). Senecio angustifolius as the major source of pyrrolizidine alkaloid contamination of rooibos tea (Aspalathus linearis). South African Journal of Botany. 110, 124-131.
- GBIF Secretariat (2022). GBIF Backbone Taxonomy. Checklist dataset https://doi.org/10.15468/39omei accessed via GBIF.org on 09-2022.
- iNaturalist (2022). iNaturalist observations: Senecio angustifolius.
- CCH2 Portal (2022). CCH2 Portal Collections Results for Senecio angustifolia accessed 9-2022.

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4. Is the species (or cultivar or variety) noted as being invasive in the US or world in a similar climate?

- Answer: **No**, which contributes **0** point(s) to the total PRE score.
- The *screener* has a **Medium** confidence in this answer based on the available literature.

Answer / Justification:

The species is now well established at widely scattered locations in the North San Diego area (USMC Camp Pendleton) and at 1-3 locations in Orange County. (Calflora and CCH2) The species has established in agricultural tea plantations in South Africa slightly North and West of its native range, but within a California climate match. Although possibly only an agricultural weed here, these occurrences are interesting but "invasiveness" is not necessarily certain. This is an agricultural weed in an irrigated environment. The plants ability to move outside of this environment is not established. I am not including these South African occurrences as "being invasive . . . in a similar climate". (Senecio a. - rooibos tea) Occurrences in Mexico, Germany, Spain and Taiwan are all considered erroneous (see Notes for further discussion). (GBIF) iNaturalist shows no occurrences outside of South Africa, other than those in California. (iNaturalist) In summary, "Invasiveness", as defined by PRE, is not thoroughly established here, at least not yet. Secondly, a Climate Match should probably NOT include plants in a horticultural or agricultural environment. In irrigated agricultural situations, we should be pretty strict with the climate match. Based on the definition of invasive and discounting agricultural weed occurrences, this question must be answered as a "NO".

Reference(s):

- Calflora (2022). Observation Search - Senecio angustifolius.
- SWINet Portal Network (2022). SEINet Portal Network Collections Search Results accessed 9-2022.
- Van Wyk, B.E., Stander M.A., & Long H.S. (2017). Senecio angustifolius as the major source of pyrrolizidine alkaloid contamination of rooibos tea (Aspalathus linearis). South African Journal of Botany. 110, 124-131.
- GBIF Secretariat (2022). GBIF Backbone Taxonomy. Checklist dataset https://doi.org/10.15468/39omei accessed via GBIF.org on 09-2022.
- iNaturalist (2022). iNaturalist observations: Senecio angustifolius.
- CCH2 Portal (2022). CCH2 Portal Collections Results for Senecio angustifolia accessed 9-2022.

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5. Are other species of the same genus (or closely related genera) invasive in a similar climate?

- Answer: **Yes**, which contributes **1** point(s) to the total PRE score.
- The *screener* has a **Very High** confidence in this answer based on the available literature.

Answer / Justification:

Several other species in the genus Senecio are invasive. In California, the Jepson eflora lists 8 Senecio as naturalized. The Cal-IPC inventory lists four species. (Cal-IPC) GISD lists seven species as invasive and CABI lists several species as invasive. (GISD)

Reference(s):

- California Invasive Plant Council (2022). The Cal-IPC Inventory access 9-2022.
- Invasive Species Specialist Group (2022). Global Invasive Species Database: Senecio species, accessed 09-22.
- Jepson Flora Project (eds.) (2022). Jepson eFlora, https://ucjeps.berkeley.edu/eflora/ [accessed Sept, 2022].

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6. Is the species (or cultivar or variety) found predominately in a climate matching the region of concern?

- Answer: **Yes**, which contributes **2** point(s) to the total PRE score.
- The *screener* has a **Very High** confidence in this answer based on the available literature.

Answer / Justification:

The large majority of world occurrences are INSIDE a California climate match, as shown in the climate matching map and compared with valid GBIF and iNaturalist occurrences. Approximately 80% match to California. Ignoring invalid points in Mexico, Europe, Asia as discussed in prior questions. (GBIF & iNaturalist) I am also including occurrences where it is documented as a weed in agricultural tea plantations in South Africa slightly North and West of its native range. Although possibly only an agricultural weed here, these occurrences are included. (Senecio a. - rooibos tea)

Reference(s):

- Van Wyk, B.E., Stander M.A., & Long H.S. (2017). Senecio angustifolius as the major source of pyrrolizidine alkaloid contamination of rooibos tea (Aspalathus linearis). South African Journal of Botany. 110, 124-131.
- GBIF Secretariat (2022). GBIF Backbone Taxonomy. Checklist dataset https://doi.org/10.15468/39omei accessed via GBIF.org on 09-2022.
- iNaturalist (2022). iNaturalist observations: Senecio angustifolius.

Impact on Native Plants and Animals (Questions 7 - 10)

7. Does this plant displace native plants and dominate (overtop or smother) the plant community in areas where it has established?

- Answer: **No**, which contributes **0** point(s) to the total PRE score.
- The *screener* has a **Low** confidence in this answer based on the available literature.

Answer / Justification:

I can find no published evidence of this species overtopping or smothering other vegetation. Collection details from CA (CCH2) do not mention this. But its mere presence does imply at least some displacement of native biomass. The plant is variably described as: "Erect or straggling, slender-stemmed shrublet, up to 500 mm tall". (Senecio angustifolius Thunb. in ref.) "Twiggy, glabrous shrublet to 60 cm." (Senecio angustifolius Thunb. in ref.) "Perennial herb to shrub, up to 1 m tall, 2 m wide, at maturity woody at base" (Simpson, M.S.) Given the size and habit of the plant it would be reasonably significant in mass when compared to other species within its chosen plant community, thus displacing, shading and interrupting an equivalent amount of native vegetation. However, without more published evidence I am remaining conservative and assigning a No answer.

Reference(s):

- CCH2 Portal (2022). CCH2 Portal Collections Results for Senecio angustifolia accessed 9-2022.
- Simpson, M. S., & Vanderhoff R. (2022). Taxonomic Identity of a Recently Naturalized Senecio Species in California. Madrono. 69(3),
- World Flora Online (2022). Senecio angustifolius (Thunb.) Willd..

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8. Is the plant noted as promoting fire and/or changing fire regimes?

- Answer: **No**, which contributes **0** point(s) to the total PRE score.
- The *screener* has a **Medium** confidence in this answer based on the available literature.

Answer / Justification:

No evidence anywhere in the literature of impacts to fire regimes. Leaving unanswered. The stature of this plant is described as up to 1 m high and 1-2 m wide at maturity and as an "Erect or straggling, slender-stemmed shrublet" (Senecio angustifolius Thunb. in ref.), "Twiggy, glabrous shrublet" (Senecio angustifolius Thunb. in ref.), or "Perennial herb to shrub . . . at maturity woody at base" (Simpson, M.). Images on Calflora (Calflora 2022) indicate that although the leaves of the shrub are small to very small, the accumulated dead branches could create some fuels. Since this plant is currently growing in areas with ample fuels, it does not change the fire regime.

Reference(s):

- Simpson, M., & Vanderhoff R. (2022). TAXONOMIC IDENTITY OF A RECENTLY NATURALIZED SENECIO SPECIES IN CALIFORNIA. (al, et., Ed.).Madrono. 69(3),
- World Flora Online (2022). Senecio angustifolius (Thunb.) Willd..
- Calflora (2022). Observation Search - Senecio angustifolius.

9. Is the plant a health risk to humans or animals/fish? Has the species been noted as impacting grazing systems?

- Answer: **Yes**, which contributes **1** point(s) to the total PRE score.
- The *screener* has a **High** confidence in this answer based on the available literature.

Answer / Justification:

A strong reference to the plant in a paper documenting its occurrence in rooibos tea production agricultural fields in South Africa states: "Further investigation revealed an explanation for the presence of PAs (pyrrolizidine alkaloids) in rooibos plants, namely that it can be absorbed from the soil where rooibos plants co-occur with Senecio plants. Soil collected at the roots of Senecio species contained relatively high levels of senecionine and senecionine N-oxide. This preliminary study of carefully collected soil samples showed that soil can be contaminated with PAs and that this offers the only plausible explanation for the presence of PAs in rooibos tea plants." The same South African paper states the following about toxins found in this species: "Pyrrolizidine alkaloids (PAs) and their N-oxides (PANOs) are amongst the most widely distributed natural toxins produced by plants and are known to be hepatotoxic to humans and animals (Bull et al., 1968, Mattocks, 1986)." The striking part of that paper was the german BfR, similar to our FDA or EPA, found these toxic alkaloids in rooibos tea products across the nation, and the paper's authors tracked down the source, which is this weed. Lastly, the same paper later offers this about livestock: ". . . the plant causes chronic PA (pyrrolizidine alkaloid) poisoning in livestock . . .". (Senecio a. - rooibos tea) However, the tea contamination may be site specific and species specific and does not necessarily confirm this would occur with other plant species or in natural areas. Nonetheless, the commente re livestock poisoning is with merit. Based on the livestock poisoning reference and the pyrrolizidine alkaloid documentation I am answering YES, with a HIGH confidence.

Reference(s):

- Van Wyk, B.E., Stander M.A., & Long H.S. (2017). Senecio angustifolius as the major source of pyrrolizidine alkaloid contamination of rooibos tea (Aspalathus linearis). South African Journal of Botany. 110, 124-131.

10. Does the plant produce impenetrable thickets, blocking or slowing movement of animals, livestock, or humans?

- Answer: **No**, which contributes **0** point(s) to the total PRE score.
- The *screener* has a **Low** confidence in this answer based on the available literature.

Answer / Justification:

This plant is variably described as: "Erect or straggling, slender-stemmed shrublet, up to 500 mm tall". (Senecio angustifolius Thunb. in ref.) "Twiggy, glabrous shrublet to 60 cm." (Senecio angustifolius Thunb. in ref.) "Erect or straggling, slender-stemmed shrublet, up to 500 mm tall." (Plants of the Greater Cape) "Perennial herb to shrub, up to 1 m tall, 2 m wide, at maturity woody at base" (Simpson, M.S.) These characters are inconclusive re its fire ecology. In observation and from limited comments in California collections it appears to become a naturalized component of the pre-existing plant community. None of the Calflora or CCH records indicate dense, thick or impenetrable stands (Calflora & CCH2). The comments that are included state "uncommon" and "rare", which would not imply thickets. Without more references, I am giving a "No" and a low confidence score. In the rooibos tea paper (Senecio angustifolius Thunb.) some of the farms are described as "heavily infested." While this may be because of soil disturbance at the tea farms, it is possible we could see this type of dense infestations in California.

Reference(s):

- Simpson, M. S., & Vanderhoff R. (2022). Taxonomic Identity of a Recently Naturalized Senecio Species in California. Madrono. 69(3),
- Conservatoire et Jardin Botaniques & South African National Biodiversity Institute (2022). African Plant Database - Jacobeaea angustifolia Thunb. accessed 9-2022.
- Snijman, D.A. (2013). Plants of the Greater Cape Floristic Region: 2. The Extra Cape Flora. Strelitzia. 30, 543.
- CCH2 Portal (2022). CCH2 Portal Collections Results for Senecio angustifolia accessed 9-2022.
- Calflora (2022). Observation Search - Senecio angustifolius.
- GBIF Secretariat (2022). GBIF Backbone Taxonomy. Checklist dataset https://doi.org/10.15468/39omei accessed via GBIF.org on 09-2022.
- World Flora Online (2022). Senecio angustifolius (Thunb.) Willd..

Reproductive Strategies (Questions 11 - 17)

11. Does this species (or cultivar or variety) reproduce and spread vegetatively?

- Answer: **No**, which contributes **0** point(s) to the total PRE score.
- The *screener* has a **High** confidence in this answer based on the available literature.

Answer / Justification:

No evidence or literature to support this. Basal branching, non succulence, lack of geophytic organs, all lead to no top vegetative reproduction. Additionally, other non succulent members of the Senecio genus are almost always obligate seeders and do not naturally reproduce vegetatively. (Anonymous - CABI) (Walter et al)

Reference(s):

- CABI Digital Library (2022). CABI search results for Senecio, accessed 9-2022.
- Walter, G. M., Abbott R. J., Brennan A. C., Bridle J. R., Chapman M., Clark J., et al. (2020). Senecio as a model system for integrating studies of genotype, phenotype and fitness. New Phytologist. 226, 326–344.

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12. If naturally detached fragments from this plant are capable of producing new plants, is this a common method of reproduction for the plant?

- Answer: **No**, which contributes **0** point(s) to the total PRE score.
- The *screener* has a **High** confidence in this answer based on the available literature.

Answer / Justification:

Almost certainly an obligate seeder, as with almost all non succulent Senecio. No evidence of any other form of reproduction in the literature. (Anonymous - CABI) (Walter)

Reference(s):

- CABI Digital Library (2022). CABI search results for Senecio, accessed 9-2022.
- Walter, G. M., Abbott R. J., Brennan A. C., Bridle J. R., Chapman M., Clark J., et al. (2020). Senecio as a model system for integrating studies of genotype, phenotype and fitness. New Phytologist. 226, 326–344.

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13. Does the species (or cultivar or variety) commonly produce viable seed?

- Answer: **Yes**, which contributes **1** point(s) to the total PRE score.
- The *screener* has a **High** confidence in this answer based on the available literature.

Answer / Justification:

Yes, the species is almost certainly an obligate seeder. (Senecio a. - anonymous), (Strelitzia) (Simpson) (Walter) Seeds were abundant on a plant examined in Orange County (8,200 potential seeds). It would be assumed that with such high seed production that a good number would be viable. (Observation of Senecio angustifolius – Calflora)

Reference(s):

- Simpson, M. S., & Vanderhoff R. (2022). Taxonomic Identity of a Recently Naturalized Senecio Species in California. Madrono. 69(3),
- Snijman, D.A. (2013). Plants of the Greater Cape Floristic Region: 2. The Extra Cape Flora. Strelitzia. 30, 543.
- World Flora Online (2022). Senecio angustifolius (Thunb.) Willd..
- Walter, G. M., Abbott R. J., Brennan A. C., Bridle J. R., Chapman M., Clark J., et al. (2020). Senecio as a model system for integrating studies of genotype, phenotype and fitness. New Phytologist. 226, 326–344.
- [Anonymous] (0). Observation of Senecio angustifolius – Calflora.

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14. Does this plant produce copious viable seeds each year (> 1000)?

- Answer: **Yes**, which contributes **1** point(s) to the total PRE score.
- The *screener* has a **Very High** confidence in this answer based on the available literature.

Answer / Justification:

A single semi-mature plant was counted for seeds in Orange County. +-50-60 seeds were counted per head. Counted +-150 heads on the semi-mature plant. That is a total of approximately 8,250 potential seeds on this plant at that moment. Considering that this species flowers and seeds almost continually throughout the year, the total seed production is well over 1,000/year. (Observation of Senecio angustifolius – Calflora) Limited other documentation about seed production. However, the very long flowering and seeding period, being year-round or nearly so (CCH2 and Calflora), abundance of flower heads (Simpson et al and Observation of Senecio angustifolius – Calflora.) would indicate well over >1,000 achenes per year per plant. Other shrubby Senecio species (S. jacobaea) have high seed viability rates, and its likely this species also has similar high viability rates, producing over 1,000 viable seeds per year. Viability in a study of shrubby Senecio jacobaea was typically from 20-70%. Seed viability was fairly long, at 6 years viability was still >5% in many soil samples. The time for seed viability to decline to 1% was estimated to be at least 4-5 years in the 0-2 cm surface layer and 10-16 years below 4 cm soil depth. (Thompson, A)

Reference(s):

- CCH2 Portal (2022). CCH2 Portal Collections Results for Senecio angustifolia accessed 9-2022.
- Calflora (2022). Observation Search - Senecio angustifolius.
- Thompson, A., & Makepeace W. (1983). Short note: Longevity of buried ragwort (Senecio jacobaea L) seed. New Zealand Journal of Experimental Agriculture. 11, 89–90.
- [Anonymous] (0). Observation of Senecio angustifolius – Calflora.

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15. Is there significant germination (>25%) of seeds the next growing season, with no requirement of an infrequent environmental condition for seeds to germinate (i.e. fire) or long dormancy period?

- Answer: **Yes**, which contributes **1** point(s) to the total PRE score.
- The *screener* has a **Low** confidence in this answer based on the available literature.

Answer / Justification:

I can find no documentation on germination of this specific species. However, these papers which are for different Senecio shrubby and similar species (S. jacobaea) and each show high germination of seeds, greater than 25% after one year. It is speculative that this species may also has have high germination as well, but it is reasonable. (Thompson, A) (Anonymous) Without specific documentation of this species answering Yes, but with Low confidence.

Reference(s):

- Thompson, A., & Makepeace W. (1983). Short note: Longevity of buried ragwort (Senecio jacobaea L) seed. New Zealand Journal of Experimental Agriculture. 11, 89–90.
- [Anonymous] (0). The Establishment of Seedlings from Primary and Regrowth Seeds of Ragwort (Senecio Jacobaea) on JSTOR.

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16. Does this plant produce viable seed within the first three years (for an herbaceous species) to five years (for a woody species) after germination?

- Answer: **Yes**, which contributes **1** point(s) to the total PRE score.
- The *screener* has a **High** confidence in this answer based on the available literature.

Answer / Justification:

Little published information. One Calflora record mentions a 4-5 year old plant in seed. (Calflora. Observation Search) Another Calflora record documents abundant seed in a two to three year old plant. (Observation of Senecio angustifolius – Calflora) This offers good information and warrants a "yes" answer for a woody plant, with a "high" confidence.

Reference(s):

- Calflora (2022). Observation Search - Senecio angustifolius.
- [Anonymous] (0). Observation of Senecio angustifolius – Calflora.

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17. Does this plant continuously produce seed for >3 months each year or does seed production occur more than once a year?

- Answer: **Yes**, which contributes **1** point(s) to the total PRE score.
- The *screener* has a **Very High** confidence in this answer based on the available literature.

Answer / Justification:

Seed production is likely most or all of the year as referenced by several sources: "It germinates and grows throughout the year (unlike most other weeds, which are highly seasonal), and is therefore more difficult to control". (Senecio a. as a source . . .) Flowering "all months" in CA (Simpson et al) Calflora lists a flowering period of April through November, which would imply well over three months of seed production. (Calflora) CCH records list flowering between the months of April and Nov., also implying well over three months of seed production. (CCH2)

Reference(s):

- Simpson, M. S., & Vanderhoff R. (2022). Taxonomic Identity of a Recently Naturalized Senecio Species in California. Madrono. 69(3),
- CCH2 Portal (2022). CCH2 Portal Collections Results for Senecio angustifolia accessed 9-2022.
- Calflora (2022). Observation Search - Senecio angustifolius.
- Van Wyk, B.E., Stander M.A., & Long H.S. (2017). Senecio angustifolius as the major source of pyrrolizidine alkaloid contamination of rooibos tea (Aspalathus linearis). South African Journal of Botany. 110, 124-131.

Dispersal (Questions 18 - 20)

18. Are the plant's propagules frequently dispersed long distance (>100 m) by mammals or birds or via domestic animals?

- Answer: **No**, which contributes **0** point(s) to the total PRE score.
- The *screener* has a **Low** confidence in this answer based on the available literature.

Answer / Justification:

No specific documentation. However, no evidence of bristles or appendages on the seed (to attach to clothing, equipment, fur, etc.) and no indication of an attachment structure of pappus. Would make this method of dispersal unlikely. Further, its pattern of occurrence in California seems as likely or likelier to come from animal-mediated or human dispersal. In California, it is present in dry canyons that are animal (and human) corridors as well as areas where wind or water could disperse them. These modes of dispersal are all inference but potential. It's mode of transport in Southern CA in fairly widely scattered populations, some separated by 35 km (CCH2 Portal), is a bit mysterious.

Reference(s):

- CCH2 Portal (2022). CCH2 Portal Collections Results for Senecio angustifolia accessed 9-2022.

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19. Are the plant's propagules frequently dispersed long distance (>100 m) by wind or water?

- Answer: **Yes**, which contributes **1** point(s) to the total PRE score.
- The *screener* has a **Medium** confidence in this answer based on the available literature.

Answer / Justification:

Little if any specific documentation. Presumed dispersal by water from its occurrences in CA that are well correlated with washes and water corridors. (CCH2) (Calflora) The achenes of the species are attached to a long pappus as seen in photographs (Calflora). However, the pappus does not appear to be feathery or plumose, which would make wind dispersal limited over long distances. The similar species, S. jacobaea, which has a similar pappus does not disperse seeds beyond 20 m. (McEvoy, P.B.) Likely water dispersal as pappus and seeds should be able to float, a trait of S. jacobaea dispersal. (McEvoy, P.B.) Answering yes, based upon likelihood of water dispersal and likely at least short distance wind dispersal.

Reference(s):

- CCH2 Portal (2022). CCH2 Portal Collections Results for Senecio angustifolia accessed 9-2022.
- Calflora (2022). Observation Search - Senecio angustifolius.
- iNaturalist (2022). iNaturalist observations: Senecio angustifolius.
- McEvoy, P.B., & Cox C.S. (1987). Wind dispersal distances in dimorphic achenes of Ragwort, Senecio jacobaea. Ecology. 68, 2006-2015.

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20. Are the plant's propagules frequently dispersed via contaminated seed (agriculture or wildflower packets), equipment, vehicles, boats or clothing/shoes?

- Answer: **No**, which contributes **0** point(s) to the total PRE score.
- The *screener* has a **Low** confidence in this answer based on the available literature.

Answer / Justification:

A thorough paper about S. angustifolius invasion in agricultural South African tea plantations makes several references to the species invading these plantations. However, the contamination of the tea harvest only references contamination via chemical soil properties and the accumulation of toxins from the Senecio via soil, not seed. The paper stops short of saying the seed is present in the harvest and thus dispersed during harvest. (Senecio a. as the source . . .) In California the known populations are rather widely scattered, with San Diego populations separated from Orange County populations by 20 miles. Within the San Diego occurrences, populations are as much as 5-10 miles separated, and in Orange County they are separated by 2 miles. (CCH2) The question asks if long-distance dispersal is "frequent", which it does not seem to be, it is certainly happening, and quite possibly via people, clothes or footwear. How the plant moved from its native South Africa to USMC Camp Pendleton is possible via equipment, vehicles or clothing. However, this is speculative and warrants the Low confidence scoring.

Reference(s):

- Van Wyk, B.E., Stander M.A., & Long H.S. (2017). Senecio angustifolius as the major source of pyrrolizidine alkaloid contamination of rooibos tea (Aspalathus linearis). South African Journal of Botany. 110, 124-131.
- CCH2 Portal (2022). CCH2 Portal Collections Results for Senecio angustifolia accessed 9-2022.

Evaluation Notes

These is a scarcity of published date about this species natural history or invasiveness, making several of these questions either unanswered or with a low confidence score. Outside of its native South Africa, California appears to be the only location the species has naturalized, making us perhaps an early indicator for other similar climate areas of the world.

Briefly mentioned in Questions 1, 2, 3, and 4 are what I am considering dubious occurrence records in Mexico, Germany, Spain, and Taiwan:

Outside of its native range in South Africa, there are eight georeferenced occurences on GBIF from Mexico. Each of these are +- in the central or the Northern Central portion of the country, outside of any climate match to California. Two of the occurrences indicate "abundant" (at two different locales) and "dominant" at the same site and date (1990). Another collection (1973) many miles away also indicates "dominant". One other unrelated occurrence indicates "scarce". Others have no abundance information. (GBIF)

A very brief mention of Senecio angustifolius in Mexico is in a research paper discussing a co-occuring plant. It is mentioned as a component of the "shrub stratum" in an area about 125km NE of Mexico City (in a non-climate matched area). (Forest Science)

However, all of these Mexican occurrences are suspect. Based on date, institution, and location, collections by Tlapa Almonte appear to be a match to locality for Senecio cinerarioides collections on SEINet on that date. The collection by Rodriguez from 1986 also appears to match another specimen identified as S. cinerarioides on SEINet. I suspect at least some or all of these collections were, or will be later redetermined as S. cinerarioides, not angustifolius. (SEINet)

Two occurences in Germany are without any abundance information or details and are inconclusive.
A single very old record (1890) from Spain and a 1932 record from Taiwan are also inconclusive, with no additional information. The former could refer to a different species. (GBIF)

Total PRE Score

PRE Score: 13 -- Moderate Potential Risk
Confidence: 70 / 100
Questions answered: 20 of 20 -- Valid (80% or more questions answered)

PRE Score Legend

The PRE Score is calculated by adding the point totals for each (answered) question.
< 13 : Low Potential Risk
13 - 15 : Moderate Potential Risk
> 15 : High Potential Risk

Questions Answered Legend

It is important to answer at least 16 questions to consider a PRE Score as "valid".
>= 16 : valid (80% or more questions answered)
<= 15 : invalid (not enough questions answered)

Organization Ownership and Content Privacy

Organization: 2022 Western IPM Grant Project
Content Privacy: Public

Evaluation Reviewers

The PRE approach is to base decisions on science and make decisions by consensus of diverse horticultural stakeholders. The literature review and process of answering PRE's questions are based on science; the decisions of which plants to prioritize are based on consensus. To ensure this process is in place and that PRE is collaborative, volunteer stakeholders are recruited from each region to review evaluations. The following experts in their profession (plant science, conservation, or horticultural trade) have participated as volunteer PRE reviewers for this evaluation:

• Elizabeth D. Brusati	March 1, 2023
• Lynn Sweet	December 23, 2022
• Nicole Valentine	December 8, 2022
• Lauren Quon	December 6, 2022
• Jutta Burger	December 4, 2022
• Chris McDonald	November 30, 2022

This evaluation has a total of 6 reviewer(s).

Evaluation Issues

The following section lists all public issues for this evaluation. Issues provide a way for stakeholder reviewers to communicate any concerns or suggestions they might have with the plant or evaluation. Please email info@plantright.org if additional action is required to resolve open issues.

Issue ID # 8871

Date Created: February 22, 2023 - 4:00pm
Date Updated: March 7, 2023 - 8:03am

Submitted by: Jutta Burger

Status: Fixed
Type: Suggestion
Severity: Minor
Scope: Q02. Is the species (or cultivar or variety) noted as being naturalized elsewhere in the US or world in a similar climate?

Issue Description

You could increase confidence to 'high' here and cite CCH2 and/or your resource from S. Africa, since the ID of this plant was confirmed and it is naturally established/ not planted in southern CA. - Jutta

Issue Resolution (Screener's Response to Issue)

Fixed. Added another citation and raised confidence to High.

Issue ID # 8706

Date Created: January 3, 2023 - 4:48pm
Date Updated: February 23, 2023 - 9:49am

Submitted by: Lynn Sweet

Status: Fixed

Type: Suggestion
Severity: Minor
Scope: Q01. Has the species (or cultivar or variety, if applicable) become naturalized where it is not native?

Issue Description

I deeply appreciate and recognize the amount of work put in here. I want to make sure this is streamlined, however. I would move all of the information about the dubious occurrences in Mexico to the Notes section at the bottom. These occurrences seem so dubious based on the evaluator's assessment that they should be counted out, and I would reduce discussion of them after the first mention as it gets a little confusing because there is so much information about them, it makes it hard to review the other information. - Lynn Sweet

Issue Resolution (Screener's Response to Issue)

Agree. I reduced my evaluator comments in these questions about these dubious records to a brief statement. I moved my more detailed comments to the "Notes" section at the end of the assessment.

Issue ID # 8705

Date Created: January 3, 2023 - 4:44pm
Date Updated: February 23, 2023 - 9:14am

Submitted by: Lynn Sweet

Status: Fixed
Type: Suggestion
Severity: Major
Scope: Q04. Is the species (or cultivar or variety) noted as being invasive in the US or world in a similar climate?

Issue Description

Hi all, weighing in on this tough PRE as requested. I hope this is helpful. To me, "spread, naturalized, expanding." All don't count as invasive. I think the information about Pendeleton needs to be more specific, just slightly. Even documentation of it displacing native plants generally. If there is more definite verbiage regarding invasiveness from Pendleton then we could give it a Yes with a Confidence Level for unpublished, personal communication from an expert (Medium), which should be listed in the sources.

Agricultural impacts are evidence of invasiveness and deemed a yes (per guidance from those involved in developing PRE) but as far as I'm reading here, there is not conclusive evidence that this species is causing significant environmental harm in the tea plantations. It may be a weedy species of gullies, or intercrop rows. - Lynn Sweet

Issue Resolution (Screener's Response to Issue)

I incorporated Lynn's excellent perspective and have adjusted down the invasiveness score. I noted the distinction between an agricultural weed and an invasive and scored the question as a "No".

Issue ID # 8692

Date Created: December 31, 2022 - 3:39pm
Date Updated: December 31, 2022 - 4:04pm

Submitted by: Ron Vanderhoff

Status: Fixed
Type: Suggestion
Severity: Minor
Scope: Q04. Is the species (or cultivar or variety) noted as being invasive in the US or world in a similar climate?

Issue Description

Regarding Climate Match, Lynn Sweet responded with:

"Climate match- I'm not convinced that even if the agricultural impacts qualify as invasive here, that the climate should be counted as similar if they are in a horticultural situation. In irrigated/agricultural situations, we should be pretty strict with the climate match. Just trying to apply the most simple logic, wouldn't climate matches be analogous conditions of natural, ambient climate? I would count this as a no."

(These issues/comments were made outside of the PRE platform and have thus been added here by the Evaluator.)

Issue Resolution (Screener's Response to Issue)

With guidance from Jutta and Lynn, this species does not, as yet, fulfill the definition of "invasive". Secondly, a Climate Match should probably NOT include plants in a horticultural or agricultural

environment. Moved to a 'No" answer and medium confidence.

Issue ID # 8690

Date Created: December 31, 2022 - 3:33pm
Date Updated: December 31, 2022 - 3:56pm

Submitted by: Ron Vanderhoff

Status: Fixed
Type: Suggestion
Severity: Major
Scope: Q03. Is the species (or cultivar or variety) noted as being invasive in the U.S. or world?

Issue Description

Regarding invasiveness, Lynn Sweet responded with, “Spread, naturalized, expanding. All don't count as invasive. Pendleton needs to be more specific, just slightly. Even documentation of it displacing native plants generally. If so, then we could give it a - whatever personal communication from an expert source is... Medium right?”

And a second comment from Lynn:

“For the CA Senecio angustifolius. I really appreciate the evaluator's efforts here. Respectfully I disagree with the answers of "yes" on Q3 and Q4. I think that the Q3 and therefore Q4 should be a "no." I appreciate the abundance of information presented, and this is a confusing case.

Agricultural impacts are evidence of invasiveness and deemed a yes (per guidance from those involved in developing PRE) but as far as I'm reading here, there is not conclusive evidence that this species is causing significant environmental harm in the tea plantations. It may be a weedy species of gullies, or intercrop rows.

The Mexican occurrences seem so dubious based on the evaluator's assessment that they should be counted out, and if they wanted they could reduce discussion of them after the first mention as it gets a little confusing because there is so much information.

The California occurrences don't have enough information for me to deem them invasive."

(These issues/comments were made outside of the PRE platform and have thus been added here by the Evaluator.)

Issue Resolution (Screener's Response to Issue)

With guidance from Jutta and Lynn, this species does not, as yet, fulfill the definition of "invasive". Moved to a 'No" answer and medium confidence.

Issue ID # 8494

Date Created: December 8, 2022 - 6:28pm
Date Updated: December 10, 2022 - 8:53am

Submitted by: Nicole Valentine

Status: Fixed
Type: Suggestion
Severity: Minor
Scope: Q07. Does this plant displace native plants and dominate the plant community in areas where it has been established?

Issue Description

Could include information on plant growth habit and reproduction. Then if you made an inference with these sources, you could up confidence to medium. -NV

Issue Resolution (Screener's Response to Issue)

I added some information about plant habit and the likelihood of displacement of native flora. However, without documentation of this I was hesitant to change the score. Left it with a NO, but a LOW confidence.

Issue ID # 8492

Date Created: December 8, 2022 - 9:00am
Date Updated: December 10, 2022 - 11:16am

Submitted by: Nicole Valentine

Status: Fixed
Type: Suggestion
Severity: Minor
Scope: Plant Information

Issue Description

The discussion of the Simpson et al. source may be more appropriate in the Evaluation Notes rather than the plant info section. -NV

Issue Resolution (Screener's Response to Issue)

I moved a sentence from the General Information area to the Evaluation Notes section. However, not exactly sure that this is what you are referring to. These is a longer discussion about the misidentification of the species also in the Genera Info section, which is detailed in the Simpson, et al paper. I thought it was valuable, but maybe that is what you are referring to.

Issue ID # 8455

Date Created: December 3, 2022 - 1:24pm
Date Updated: December 10, 2022 - 9:24pm

Submitted by: Jutta Burger

Status: Fixed
Type: Suggestion
Severity: Minor
Scope: Q18. Are the plant’s propagules dispersed long distance (>100 m) by mammals or birds or via domestic animals?

Issue Description

Its pattern of occurrence seems as likely or likelier to come from animal-mediated or human dispersal. It would be good to make mention of this, since the dry canyons that it occurs in are animal (and human) corridors as well as areas where wind or water could disperse them. This is all inference but still worth adding, since its distribution in S. CA is a bit mysterious. - Jutta Burger

Issue Resolution (Screener's Response to Issue)

I added this additional information. Jutta, are you suggesting this could flip from a No to a Yes score with perhaps a Low confidence?

Issue ID # 8452

Date Created: December 3, 2022 - 11:34am
Date Updated: December 10, 2022 - 9:58am

Submitted by: Jutta Burger

Status: Fixed
Type: Suggestion
Severity: Minor
Scope: Q16. Does this plant produce viable seed within the first three years (for an herbaceous species) to five years (for a woody species) after germination?

Issue Description

If you have at least a record/report of an individual that is 4-5 years being in seed, that would warrant a "yes" answer for a woody plant, albeit at "low" confidence. - Jutta

Issue Resolution (Screener's Response to Issue)

Excellent. Edited to Yes, with Low confidence.

Issue ID # 8450

Date Created: December 3, 2022 - 8:29am
Date Updated: December 9, 2022 - 6:45pm

Submitted by: Jutta Burger

Status: Fixed
Type: Suggestion
Severity: Major
Scope: Q14. Does this plant produce copious viable seeds each year (>1000)?

Issue Description

I think you can upgrade this answer to "medium" confidence. If you have viability, number of flower heads, and number of florets, then you have enough evidence for "yes" with "medium" confidence. - Jutta

Issue Resolution (Screener's Response to Issue)

Agreed and adjusted.

Issue ID # 8449

Date Created: December 3, 2022 - 8:23am
Date Updated: December 31, 2022 - 3:59pm

Submitted by: Jutta Burger

Status: Fixed
Type: Suggestion
Severity: Major
Scope: Q04. Is the species (or cultivar or variety) noted as being invasive in the US or world in a similar climate?

Issue Description

I just don't think there is enough evidence currently to fit the definition of this being invasive anywhere, unfortunately. Based on your explanation, sources only describe either presence or at most local abundance, but not impact as per definition for invasive in PRE. Even if it is described as a nuisance weed in tea plantations, that does not seem to qualify it as invasive. At most, I could see its impacts in the tea plantation (mainly if it is a threat due to toxicity) as potentially qualifying, but even so I think the Confidence would be low. Evidence for invasiveness must be more than than for just being "well

established". - Jutta

Issue Resolution (Screener's Response to Issue)

Hi Jutta,

Before I make a change to the score here I just want to double check. My justification for my "invasive" status has to do with the populations at USMC Camp Pendleton in North San Diego County. It is rather well established here. I have had a couple of brief conversations with Jon Rebman and one of the Pendleton staff biologists who is working on the management. There is certainly concern on their part, but there is no public documentation of this. There are now at least nine populations (each separated by at least 2 km) and it has spread over several kilometers and through at least four different watersheds.

It has certainly naturalized there and it's footprint is expanding. However, it's environmental impacts at Pendleton are not yet likely understood or quantified since it has only been on the site for perhaps little over a decade..

If I were to change the score here, should I not also change it similarly in question #3? It would seem so. How would you feel about answering this with a YES, but lowering the confidence score? Of course, I trust your expertise on this and will follow your advice, just want to be certain.

12-31-2022:

With guidance from Jutta and Lynn, this species does not, as yet, fulfill the definition of "invasive". Also, if agricultural weeds are removed from the climate match definition it also fails. Moved to a 'No" answer and medium confidence.

Issue ID # 8448

Date Created: December 3, 2022 - 8:20am
Date Updated: December 31, 2022 - 4:02pm

Submitted by: Jutta Burger

Status: Fixed
Type: Suggestion
Severity: Minor
Scope: Q03. Is the species (or cultivar or variety) noted as being invasive in the U.S. or world?

Issue Description

I just don't think there is enough evidence currently to fit the definition of this being invasive anywhere, unfortunately. Based on your explanation, sources only describe either presence or at most local abundance, but not impact as per definition for invasive in PRE. Even if it is described as a nuisance weed in tea plantations, that does not seem to qualify it as invasive. At most, I could see its impacts in the tea plantation (mainly if it is a threat due to toxicity) as potentially qualifying, but even so I think the Confidence would be low. Evidence for invasiveness must be more than than for just being "well established". - Jutta

Issue Resolution (Screener's Response to Issue)

With guidance from Jutta and Lynn, this species does not, as yet, fulfill the definition of "invasive". Moved to a 'No" answer and medium confidence.

Issue ID # 8447

Date Created: December 3, 2022 - 8:04am
Date Updated: December 10, 2022 - 11:01am

Submitted by: Jutta Burger

Status: Fixed
Type: Comment
Severity: Minor
Scope: Plant Information

Issue Description

Suggest changing "owing to" in "There is a scarcity of published information about this species, especially its invasiveness, owing to a low confidence score." to "has resulted in" since "owing to" is used to point to a causal agent, not an outcome. - Jutta Burger

Issue Resolution (Screener's Response to Issue)

Done.

Issue ID # 8443

Date Created: November 30, 2022 - 5:24pm
Date Updated: December 10, 2022 - 9:56am

Submitted by: Chris McDonald

Status: Fixed
Type: Suggestion
Severity: Minor
Scope: Q15. Is there significant germination (>25%) of seeds the next growing season, with no requirement of an infrequent environmental condition for seeds to germinate (i.e. fire) or long dormancy period?

Issue Description

These papers which are for different Senecio species all show they have high germination of Senecio seeds and is greater than 25% after 1 year. Its speculative that this species has high germination as well, but it is possible.

https://www.jstor.org/stable/2259781#metadata_info_tab_contents

https://onlinelibrary.wiley.com/doi/full/10.1111/j.1365-3180.2008.00625.x?casa_token=kb9a3AVF6xkAAAAA%3AnG_IXWRb1nH3cd_kaFkyvZTxDro2u62nDfnKAcO06tqR6WwiNl71_hMLBwDgl1smzHjNB_6ulAClB8Rw

https://www.tandfonline.com/doi/pdf/10.1080/03015521.1983.10427734?needAccess=true

Issue Resolution (Screener's Response to Issue)

Based on the germination studies of the similar S. jacobaea I raised the score to Yes, but with Low confidence. I did not include the paper about germination of S. vulgaris. This is an annual species and I would expect high germination and non-comparable traits when compared with a longer lived, shrubby, perennial species..

Issue ID # 8442

Date Created: November 30, 2022 - 5:16pm
Date Updated: December 10, 2022 - 9:29am

Submitted by: Chris McDonald

Status: Fixed
Type: Suggestion
Severity: Minor
Scope: Q14. Does this plant produce copious viable seeds each year (>1000)?

Issue Description

I think you can add (and then I think it's allowed to increase the confidence to medium) that other Senecio species have high seed viability rates, and its likely this species also has high viability rates, producing over 1,000 viable seeds per year. Viability in this study for a different Senecio was typically from 20-70%. Seed longevity was awful, at 6 years viability was still >5% in many soil samples but that's important for
management. https://www.tandfonline.com/doi/pdf/10.1080/03015521.1983.10427734?needAccess=true

Issue Resolution (Screener's Response to Issue)

I added the reference above to the Senecio jacobaea seed germination and viability study. However, I did not raise the confidence - it is already at Medium.

Issue ID # 8441

Date Created: November 30, 2022 - 5:08pm
Date Updated: December 10, 2022 - 8:58am

Submitted by: Chris McDonald

Status: Fixed
Type: Suggestion
Severity: Minor
Scope: Q10. Does the plant produce impenetrable thickets, blocking or slowing movement of animals, livestock, or humans?

Issue Description

I'd add that in the rooibos tea paper some of the farms are described as "heavily infested." While this may be because of soil disturbance at the tea farms, it is possible we will see this type of dense infestations in California (if it hasn't already begun in CA).

Issue Resolution (Screener's Response to Issue)

Agree. Added that information. No change to the scoring.

Issue ID # 8440

Date Created: November 30, 2022 - 4:50pm
Date Updated: December 10, 2022 - 10:53am

Submitted by: Chris McDonald

Status: Fixed
Type: Suggestion
Severity: Minor
Scope: Q20. Are the plant’s propagules frequently dispersed via contaminated seed, equipment, vehicles, boats or clothing/shoes?

Issue Description

I'd add in the description that the population on Pendleton and the OC population are separated by 20 miles. And then within those two clusters the Pendleton population contains individuals that are 5-10 miles separated, and the OC population is 2 miles wide. The question asks if long-distance dispersal is "frequent", which this doesn't seem to be frequent dispersal, but it certainly is happening, and quite possibly via people, clothes or footwear.

Issue Resolution (Screener's Response to Issue)

Excellent points. The detail is edited and quantifies these rather disjunct population distances and the inference of human/mechanical dispersal. No change to the scoring for the question.

Issue ID # 8439

Date Created: November 30, 2022 - 4:44pm
Date Updated: December 10, 2022 - 10:35am

Submitted by: Chris McDonald

Status: Fixed
Type: Suggestion
Severity: Minor
Scope: Q19. Are the plant’s propagules frequently dispersed long distance (>100 m) by wind or water?

Issue Description

From some of the pictures online (iNat here: https://www.inaturalist.org/observations/9957776 and CalFlora here: https://www.calflora.org/entry/occdetail.html?seq_num=mg138884) and that the tribe Senecioneae is characterized by a long thin pappus, I want to make sure the seeds do not have along pappus that aids in wind dispersal? Most of the Senecio's have a pappus that aids in wind dispersal (see Senecio vulgaris), that being said most Senecio jacobaea seeds do not disperse beyond 20 m. I'd recommending keeping the answer yes, and medium confidence likely due to water dispersal as pappus and seeds should be able to float. (S. jacobaea
dispersal https://www.jstor.org/stable/1939891#metadata_info_tab_contents

Issue Resolution (Screener's Response to Issue)

I added information from the Senecio jacobaea paper on dispersal. Although the achenes are long, they do not appear feathery or plumose as in classic long distance wind-dispersed Asteraceae. I did not change the scoring, since it was already at Yes and Medium, but this does add valuable supporting references and detail.

Issue ID # 8438

Date Created: November 30, 2022 - 4:18pm
Date Updated: December 10, 2022 - 9:14pm

Submitted by: Chris McDonald

Status: Fixed
Type: Suggestion
Severity: Minor
Scope: Regional Information

Issue Description

The climate matching map is not working correctly. Under "where will the plant be sold" click California. Then on the bottom left corner of the map in the GBIF box enter the species name. This will place a GBIF overlay under the matching climate regions. Then on the left bar click share and download, and then click share link. Copy and paste the link into the PRE question. This should then give you a map of CA climate regions with a GBIF layer for this Senecio.

Issue Resolution (Screener's Response to Issue)

Corrected.

Issue ID # 8437

Date Created: November 30, 2022 - 3:30pm
Date Updated: December 10, 2022 - 11:08am

Submitted by: Chris McDonald

Status: Fixed
Type: Suggestion
Severity: Minor
Scope: Evaluation as a whole

Issue Description

Please add the first line form the Senecio and rooibos tea paper to the discussion of the toxicity. "Pyrrolizidine alkaloids (PAs) and their *N*-oxides (PANOs) are amongst the most widely distributed natural toxins produced by plants and are known to be hepatotoxic to humans and animals (Bull et al., 1968, Mattocks, 1986)."

The striking part of that paper was the german BfR, similar to our FDA or EPA, found these toxic alkaloids in rooibos tea products across the nation, and the paper's authors tracked down the source, which is this weed.

Issue Resolution (Screener's Response to Issue)

Done. I added this information in my response to Q9, where it would seem to be the most appropriate.

Issue ID # 8436

Date Created: November 30, 2022 - 3:25pm
Date Updated: December 9, 2022 - 7:27pm

Submitted by: Chris McDonald

Status: Fixed
Type: Suggestion
Severity: Minor
Scope: Q08. Is the plant noted as promoting fire and/or changing fire regimes?

Issue Description

Since there is no data on the fire ecology of this species, please include the species physical stature as a potential fire effect. This would help add a little evidence, despite that I think the final answer is still "no" it doesn't change the fire regime, with low confidence. For example, At maturity S. angustifolius is 0.5 to 1.5 m tall and about 1-2 m wide, and although the leaves of the shrub are small to very small, the accumulated dead branches (based on the CalFlora pictures Ron took) could create some fuels. Since this plant is currently growing in areas with ample fuels, it does not change the fire regime.

Issue Resolution (Screener's Response to Issue)

Excellent suggestion. I added details of the plant habit and structure, etc. Added a score of "No", with a Medium confidence.

Issue ID # 8435

Date Created: November 30, 2022 - 2:47pm
Date Updated: December 9, 2022 - 7:14pm

Submitted by: Chris McDonald

Status: Fixed
Type: Suggestion
Severity: Minor
Scope: Q01. Has the species (or cultivar or variety, if applicable) become naturalized where it is not native?

Issue Description

Please clarify that this Senecio is not the same species as rooibos tea (Aspalathus linearis). It is a weed growing in rooibos tea farms. "(Senecio a. - rooibos tea)" for clarity, change to Senecio growing in rooibos tea.--Chris McDonald

Issue Resolution (Screener's Response to Issue)

Corrections are made. Additional text has been to clarify the distinction of the two plants. One of the reference descriptions also changed to avoid confusion.

About PRE and this Plant Evaluation Report

The Plant Risk Evaluator (PRE) is an online database and platform designed to assess the risk of a plant becoming invasive in a given region.This tool offers many benefits, and we encourage you to visit the PRE website (https://pretool.org) for more information.

If you would like to learn more about PRE, please email us at info@plantright.org, requesting a PRE Account.

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