Taxon: Asplenium bulbiferum G. Forst. **Family:** Aspleniaceae

Common Name(s): hen-and-chickens
mother fern
mother spleenwort

Synonym(s): Asplenium bullatum Wall. ex Mett.
Asplenium cavalerianum Christ
Asplenium viridissimum Hayata
Caenopteris bulbifera (G. Forst.)

Assessor: Chuck Chimera **Status:** Assessor Approved **End Date:** 10 Oct 2016

WRA Score: 4.0 **Designation:** L **Rating:** Low Risk

Keywords: Terrestrial, Epiphytic, Shade Tolerant, Palatable, Bulbils

Qsn #	Question	Answer Option	Answer
101	Is the species highly domesticated?	y=-3, n=0	n
102	Has the species become naturalized where grown?		
103	Does the species have weedy races?		
201	Species suited to tropical or subtropical climate(s) - If island is primarily wet habitat, then substitute "wet tropical" for "tropical or subtropical"	(0-low; 1-intermediate; 2-high) (See Appendix 2)	High
202	Quality of climate match data	(0-low; 1-intermediate; 2-high) (See Appendix 2)	High
203	Broad climate suitability (environmental versatility)	y=1, n=0	n
204	Native or naturalized in regions with tropical or subtropical climates	y=1, n=0	y
205	Does the species have a history of repeated introductions outside its natural range?	y=-2, ?=-1, n=0	y
301	Naturalized beyond native range		
302	Garden/amenity/disturbance weed	n=0, y = 1*multiplier (see Appendix 2)	n
303	Agricultural/forestry/horticultural weed	n=0, y = 2*multiplier (see Appendix 2)	n
304	Environmental weed	n=0, y = 2*multiplier (see Appendix 2)	n
305	Congeneric weed		
401	Produces spines, thorns or burrs	y=1, n=0	n
402	Allelopathic		
403	Parasitic	y=1, n=0	n
404	Unpalatable to grazing animals	y=1, n=-1	n
405	Toxic to animals	y=1, n=0	n
406	Host for recognized pests and pathogens	y=1, n=0	n
407	Causes allergies or is otherwise toxic to humans	y=1, n=0	n
408	Creates a fire hazard in natural ecosystems	y=1, n=0	n

Qsn #	Question	Answer Option	Answer
409	Is a shade tolerant plant at some stage of its life cycle	y=1, n=0	y
410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y=1, n=0	y
411	Climbing or smothering growth habit	y=1, n=0	n
412	Forms dense thickets		
501	Aquatic	y=5, n=0	n
502	Grass	y=1, n=0	n
503	Nitrogen fixing woody plant	y=1, n=0	n
504	Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)	y=1, n=0	n
601	Evidence of substantial reproductive failure in native habitat	y=1, n=0	n
602	Produces viable seed	y=1, n=-1	y
603	Hybridizes naturally	y=1, n=-1	y
604	Self-compatible or apomictic		
605	Requires specialist pollinators	y=-1, n=0	n
606	Reproduction by vegetative fragmentation	y=1, n=-1	y
607	Minimum generative time (years)		
701	Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)	y=1, n=-1	n
702	Propagules dispersed intentionally by people	y=1, n=-1	y
703	Propagules likely to disperse as a produce contaminant		
704	Propagules adapted to wind dispersal	y=1, n=-1	y
705	Propagules water dispersed		
706	Propagules bird dispersed	y=1, n=-1	n
707	Propagules dispersed by other animals (externally)	y=1, n=-1	n
708	Propagules survive passage through the gut		
801	Prolific seed production (>1000/m2)		
802	Evidence that a persistent propagule bank is formed (>1 yr)		
803	Well controlled by herbicides		
804	Tolerates, or benefits from, mutilation, cultivation, or fire		
805	Effective natural enemies present locally (e.g. introduced biocontrol agents)		

Supporting Data:

Qsn #	Question	Answer
101	**Is the species highly domesticated?**	**n**
	Source(s)	**Notes**
	Allan, H.H. 1982. Flora of New Zealand, Volume I: Indigenous Tracheophyta - Psilopsida, Lycopsida, Filicopsida, Gymnospermae, Dicotyledons. First electronic edition. Landcare Research, Lincoln, New Zealand	"Common in lowland to lower montane forests throughout. Endemic."

102	**Has the species become naturalized where grown?**	
	Source(s)	**Notes**
	WRA Specialist. 2016. Personal Communication	NA

103	**Does the species have weedy races?**	
	Source(s)	**Notes**
	WRA Specialist. 2016. Personal Communication	NA

201	**Species suited to tropical or subtropical climate(s) - If island is primarily wet habitat, then substitute "wet tropical" for "tropical or subtropical"**	**High**
	Source(s)	**Notes**
	Jones, D. L. 1987. Encyclopedia of Ferns. Timber Press, Portland, OR	"Australia, New Zealand" ... "Temp.-S.Trop." [Temperate to subtropical climates]

202	**Quality of climate match data**	**High**
	Source(s)	**Notes**
	Jones, D. L. 1987. Encyclopedia of Ferns. Timber Press, Portland, OR	

203	**Broad climate suitability (environmental versatility)**	**n**
	Source(s)	**Notes**
	Allan, H.H. 1982. Flora of New Zealand, Volume I: Indigenous Tracheophyta - Psilopsida, Lycopsida, Filicopsida, Gymnospermae, Dicotyledons. First electronic edition. Landcare Research, Lincoln, New Zealand	"Common in lowland to lower montane forests throughout." [Elevation range may exceed 1000 m]
	Plants Rescue. (2016). Asplenium bulbiferum. http://www.plantsrescue.com/asplenium-bulbiferum/. [Accessed 10 Oct 2016]	"Hardiness zone: 9-11"
	Monrovia. (2016). Mother Fern - Asplenium bulbiferum. http://www.monrovia.com/plant-catalog/plants/1211/mother-fern/. [Accessed]	"USDA Hardiness Zone: 9 - 11"

Qsn #	Question	Answer
204	**Native or naturalized in regions with tropical or subtropical climates**	**y**
	Source(s)	**Notes**
	Jones, D. L. 1987. Encyclopedia of Ferns. Timber Press, Portland, OR	"Australia, New Zealand" ... "Temp.-S.Trop." [Temperate to subtropical climates]

205	**Does the species have a history of repeated introductions outside its natural range?**	**y**
	Source(s)	**Notes**
	Jones, D. L. 1987. Encyclopedia of Ferns. Timber Press, Portland, OR	"A very familiar fern which is a popular item of the nursery trade in many countries. Excellent for indoor decoration and makes an impressive basket specimen."

301	**Naturalized beyond native range**	
	Source(s)	**Notes**
	McCormack, G. 2007. Cook Islands Biodiversity Database, Version 2007.2. Cook Islands Natural Heritage Trust, Rarotonga. http://cookislands.bishopmuseum.org. [Accessed 10 Oct 2016]	"COOK ISLANDS STATUS: Introduced (1990 by Ann Tierney), not naturalized; Land, garden"
	Galera, H., & Ratyńska, H. (1999). Greenhouse weeds in the Botanical Garden of PAS in Warsaw-Powsin. Acta Societatis Botanicorum Poloniae, 68(3), 227-236	"In the case of greenhouses, some exotic plants may be undesired too, although they are not usually associated with the term weed. These species arc called greenhouse-escapes here." [Asplenium bulbiferum listed as a greenhouse escape]
	Wagner, W.L., Herbst, D.R.& Lorence, D.H. 2016. Flora of the Hawaiian Islands. Smithsonian Institution, Washington, D.C. http://botany.si.edu/. [Accessed 10 Oct 2016]	No evidence to date

302	**Garden/amenity/disturbance weed**	**n**
	Source(s)	**Notes**
	Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	No evidence

303	**Agricultural/forestry/horticultural weed**	**n**
	Source(s)	**Notes**
	Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	No evidence

Qsn #	Question	Answer
304	**Environmental weed**	**n**
	Source(s)	**Notes**
	Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	No evidence

305	**Congeneric weed**	
	Source(s)	**Notes**
	Randall, R.P. 2012. A Global Compendium of Weeds. 2nd Edition. Department of Agriculture and Food, Western Australia	Possibly. A number of taxa have been listed as naturalized, and/or weeds of unspecified impacts

401	**Produces spines, thorns or burrs**	**n**
	Source(s)	**Notes**
	Allan, H.H. 1982. Flora of New Zealand, Volume I: Indigenous Tracheophyta - Psilopsida, Lycopsida, Filicopsida, Gymnospermae, Dicotyledons. First electronic edition. Landcare Research, Lincoln, New Zealand	[No evidence] "Rhizome short, stout, branching, often forming rounded mass; clad in translucent ovate-attenuate paleae c. 15 × 3 mm.; stipites tufted, with dense tuft of paleae at base. Stipes stout to slender, firm, (1)-10-30 cm. × 5-10 mm., us. densely clad in shorter paleae when young, dark brown towards base, green in upper part, grooved, ± compressed. Rhachis narrowly winged, stout to slender, pale green, bearing numerous alt. pinnae. Lamina submembr., rather pale to dark green, ovate-oblong-lanceolate, acuminate, bipinnate to pinnatisect, (5)-30-80-(120) × (2)-10-20-(30) cm. Pinnae ovate lanceolate, shortly stalked, acuminate, spreading at wide angle, (2)-10-15-(25) × (1)-3-5-(7) cm.; costa winged. Secondary pinnae decreasing in size to apex of primary pinna; lower ovate-oblong to lanceolate, obtuse, up to 4 cm. × 15 mm.; upper pinnatisect, segs up to 15 mm. long, about oblong, obtuse; margins crenate to crenate-serrate to subentire. Sori numerous, broad oblong, submarginal, 2-5 mm. long; indusium firm, obscured by mature sori. Bulbils on veinlets of upper surface, with fronds up to 8 cm. long before falling."

402	**Allelopathic**	
	Source(s)	**Notes**
	WRA Specialist. 2016. Personal Communication	Unknown

403	**Parasitic**	**n**
	Source(s)	**Notes**
	Allan, H.H. 1982. Flora of New Zealand, Volume I: Indigenous Tracheophyta - Psilopsida, Lycopsida, Filicopsida, Gymnospermae, Dicotyledons. First electronic edition. Landcare Research, Lincoln, New Zealand	"Rhizome short, stout, branching, often forming rounded mass; clad in translucent ovate-attenuate paleae c. 15 × 3 mm.; stipites tufted, with dense tuft of paleae at base." [Aspleniaceae. No evidence]

404	**Unpalatable to grazing animals**	**n**

Qsn #	Question	Answer
	Source(s)	**Notes**
	Coleman, J. D., Green, W. Q., & Polson, J. G. (1985). Diet of brushtail possums over a pasture-alpine gradient in Westland, New Zealand. New Zealand Journal of Ecology, 8: 21-35	"Only one fern, Asplenium bulbiferum, was eaten frequently (1.9%)." ... "Of the lesser species, Asplenium bulbiferum was preferred by females at all altitudes and in most seasons, and 'grasses' by males at all altitudes and seasons."
	Timmins, S. M. (2002). Impact of cattle on conservation land licensed for grazing in South Westland, New Zealand. New Zealand Journal of Ecology, 26(2): 107-120	"Some plant species appeared to be highly palatable to cattle and only occurred on sites without cattle. Such species included pate (Schefflera digitata), broadleaf (Griselinia littoralis), pigeonwood (Hedycarya arborea), supplejack (Ripogonum scandens), mahoe (Melicytus ramiflorus), milk tree (Streblus heterophyllus), lancewood (Pseudopanax crassifolius) and hen and chickens fern (Asplenium bulbiferum)."
	Mark, A. F., & Baylis, G. T. S. (1975). Impact of deer on Secretary Island, Fiordland, New Zealand. Proceedings of the New Zealand Ecological Society 22: 19-24	"The first deer to invade an area of forest on Secretary Island show an almost exclusive preference for bark of Pseudopanax colensoi var. ternatum. Young shoots of P. linearis and juvenile P. crassifolium are also sought. Intensive browsing is begun in areas of Asplenium bulbiferum and continued where Polystichum vestitum and bushes of Coprosma spp. are plentiful." ... "Intensive browsing appears to be the feeding of a herd of deer. The areas preferred are those with ground cover of Asplenium bulbiferum (Fig, 5), Though it is usually ignored in selective browsing, it now loses almost every leaf."
	Mark, A. F. (1989). Responses of indigenous vegetation to contrasting trends in utilization by red deer in two southwestern New Zealand National Parks. New Zealand Journal of Ecology, 12: 103-114	"With Asplenium bulbiferum both juvenile and adult plants declined and all four of the latter were severely browsed by 1987."

405	Toxic to animals	n
	Source(s)	**Notes**
	ASPCA. 2016. Parsley Fern. http://www.aspca.org/pet-care/animal-poison-control/toxic-and-non-toxic-plants/parsley-fern. [Accessed 7 Oct 2016]	"Asplenium bulbiferum ... Toxicity: Non-Toxic to Dogs, Non-Toxic to Cats"
	Mark, A. F. (1989). Responses of indigenous vegetation to contrasting trends in utilization by red deer in two southwestern New Zealand National Parks. New Zealand Journal of Ecology, 12: 103-114	"With Asplenium bulbiferum both juvenile and adult plants declined and all four of the latter were severely browsed by 1987." [No evidence]
	Quattrocchi, U. 2012. CRC World Dictionary of Medicinal and Poisonous Plants: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	No evidence

406	Host for recognized pests and pathogens	n
	Source(s)	**Notes**

Qsn #	Question	Answer
	Plants Rescue. (2016). Asplenium bulbiferum. http://www.plantsrescue.com/asplenium-bulbiferum/. [Accessed 10 Oct 2016]	"Problems: Asplenium bulbiferum are rarely bothered by pests. Space out the ferns to allow air circulation as this will assist with prevention of wilting. They can be troubled by snails and slugs, however, if grown outside. A single slug can devour a whole leaf. Treatment: Use from time to time a snail bait to prevent or combat snails and slugs, especially in spring when fern develop new fronds. Asplenium bulbiferum can attract aphids. Treatment: Sighted spray (use at lowest of recommended rate) the ferns with insecticide. Asplenium bulbiferum can get Crown rot (growing tip gets mushy) if the ferns sit with too much water in crown especially after long dry period. Yellowing of fern fronds – in ground ferns often due to over exposure to direct sun. Treatment: need more shade to allow normal greening to operate. Relocate the fern in a suitable position. Yellowing of fern fronds – in potted ferns that looks very old and roots are coming through the bottom and fern is struggling probably root-bound with lack of nutriment. Treatment: Take out from its pot and trim back side roots and re-pot with new potting mix."

407	Causes allergies or is otherwise toxic to humans	n
	Source(s)	**Notes**
	Dave's Garden. (2016). Hen and Chickens Fern - Asplenium bulbiferum. http://davesgarden.com/guides/pf/go/55521/. [Accessed 10 Oct 2016]	"Danger: N/A"
	Quattrocchi, U. 2012. CRC World Dictionary of Medicinal and Poisonous Plants: Common Names, Scientific Names, Eponyms, Synonyms, and Etymology. CRC Press, Boca Raton, FL	"Fronds decoction taken for liver problems. Leaves paste applied for hemorrhoids."

408	Creates a fire hazard in natural ecosystems	n
	Source(s)	**Notes**
	Brownsey, P.J. & Smith-Dodsworth, J.C. 1989. New Zealand Ferns and Allied Plants. David Bateman Ltd, Auckland, New Zealand	"Likes damp, shade places with plenty of humus." [No evidence. Unlikely given habit and habitat]

409	Is a shade tolerant plant at some stage of its life cycle	y
	Source(s)	**Notes**
	Brownsey, P.J. & Smith-Dodsworth, J.C. 1989. New Zealand Ferns and Allied Plants. David Bateman Ltd, Auckland, New Zealand	"Likes damp, shaded places with plenty of humus. Easily propagated from the bulbils if they are planted in humus."

410	Tolerates a wide range of soil conditions (or limestone conditions if not a volcanic island)	y
	Source(s)	**Notes**

Qsn #	Question	Answer
	Dave's Garden. (2016). Hen and Chickens Fern - Asplenium bulbiferum. http://davesgarden.com/guides/pf/go/55521/. [Accessed 10 Oct 2016]	"Soil pH requirements: 5.6 to 6.0 (acidic) 6.1 to 6.5 (mildly acidic) 6.6 to 7.5 (neutral)"
	Shoot Gardening. (2016). Asplenium bulbiferum (Hen and chickens fern). https://www.shootgardening.co.uk/plant/asplenium-bulbiferum. [Accessed 10 Oct 2016]	"Soil type - Chalky, Clay, Loamy, Sandy (will tolerate most soil types)"
	Plants Rescue. (2016). Asplenium bulbiferum. http://www.plantsrescue.com/asplenium-bulbiferum/. [Accessed 10 Oct 2016]	"Soil: It grows in well-drained or moist but well-drained soil. Amend heavy clay or sandy soils with organic matter."

411	Climbing or smothering growth habit	n
	Source(s)	**Notes**
	Allan, H.H. 1982. Flora of New Zealand, Volume I: Indigenous Tracheophyta - Psilopsida, Lycopsida, Filicopsida, Gymnospermae, Dicotyledons. First electronic edition. Landcare Research, Lincoln, New Zealand	"Rhizome short, stout, branching, often forming rounded mass; clad in translucent ovate attenuate paleae c. 15 × 3 mm.; stipites tufted, with dense tuft of paleae at base. Stipes stout to slender, firm, (1)-10-30 cm. × 5-10 mm., us. densely clad in shorter paleae when young, dark brown towards base, green in upper part, grooved, ± compressed. Rhachis narrowly winged, stout to slender, pale green, bearing numerous alt. pinnae. Lamina submembr., rather pale to dark green, ovate-oblong-lanceolate, acuminate, bipinnate to pinnatisect, (5)-30-80-(120) × (2)-10-20-(30) cm. Pinnae ovate lanceolate, shortly stalked, acuminate, spreading at wide angle, (2)-10-15-(25) × (1)-3-5-(7) cm.; costa winged. Secondary pinnae decreasing in size to apex of primary pinna; lower ovate-oblong to lanceolate, obtuse, up to 4 cm. × 15 mm.; upper pinnatisect, segs up to 15 mm. long, about oblong, obtuse; margins crenate to crenate-serrate to subentire. Sori numerous, broad oblong, submarginal, 2-5 mm. long; indusium firm, obscured by mature sori. Bulbils on veinlets of upper surface, with fronds up to 8 cm. long before falling."

412	Forms dense thickets	
	Source(s)	**Notes**
	Michel, P., Dickinson, K. J., Barratt, B. I., & Jamieson, I. G. (2010). Habitat selection in reintroduced bird populations: a case study of Stewart Island robins and South Island saddlebacks on Ulva Island. New Zealand Journal of Ecology, 34(2): 237-246	"Although food availability (invertebrate abundance and diversity in litter) did not differ between sites ... food accessibility could have been affected by the dense cover of Asplenium bulbiferum (Table 2)." [Forms dense cover that may exclude other vegetation]

501	Aquatic	n
	Source(s)	**Notes**
	Allan, H.H. 1982. Flora of New Zealand, Volume I: Indigenous Tracheophyta - Psilopsida, Lycopsida, Filicopsida, Gymnospermae, Dicotyledons. First electronic edition. Landcare Research, Lincoln, New Zealand	[Terrestrial] "Common in lowland to lower montane forests throughout."

Qsn #	Question	Answer
502	**Grass**	**n**
	Source(s)	**Notes**
	USDA, ARS, Germplasm Resources Information Network, 2016. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html. [Accessed 7 Oct 2016]	Family: Aspleniaceae

503	**Nitrogen fixing woody plant**	**n**
	Source(s)	**Notes**
	USDA, ARS, Germplasm Resources Information Network, 2016. National Plant Germplasm System [Online Database]. http://www.ars-grin.gov/npgs/index.html. [Accessed 7 Oct 2016]	Family: Aspleniaceae

504	**Geophyte (herbaceous with underground storage organs -- bulbs, corms, or tubers)**	**n**
	Source(s)	**Notes**
	Allan, H.H. 1982. Flora of New Zealand, Volume I: Indigenous Tracheophyta - Psilopsida, Lycopsida, Filicopsida, Gymnospermae, Dicotyledons. First electronic edition. Landcare Research, Lincoln, New Zealand	"RHIZOME short, thick; scales without teeth, long pointed. FRONDS tufted, arching, thick, dark green, to 1.5 m long but generally much less. BLADE ovate in outline. divided 2- 3 times, segments with veins extending to each tooth, the segments producing plantlets on the upper surface of ribs towards their tips."

601	**Evidence of substantial reproductive failure in native habitat**	**n**
	Source(s)	**Notes**
	Brownsey, P.J. & Smith-Dodsworth, J.C. 1989. New Zealanc Ferns and Allied Plants. David Bateman Ltd, Auckland, New Zealand	"Common as a terrestrial fern in lowland to lower montane forest; occurs throughout except for drier parts of south Canterbury and inland Otago."

602	**Produces viable seed**	**y**
	Source(s)	**Notes**
	Brame, J. (1929). Ferns of New Zealand. American Fern Journal, 1(2), 51-55	"Another peculiarity has been noticed in connection with Asplenium flaccidum which occasionally produces bulbils on both epiphyte and terrestrial plants, although it is rarely bulbiferous like Asplenium bulbiferum that produces these curious bud-like growths from parts of the frond as well as the usual spores."
	Plants Rescue. (2016). Asplenium bulbiferum. http://www.plantsrescue.com/asplenium-bulbiferum/. [Accessed 10 Oct 2016]	"Propagation: Asplenium bulbiferum is easily propagated by means of the bulbils that grow on the mature fronds. When the bulbils are carrying three of four miniature fronds, they can be easily detached between the finger and thumb and then planted in small pots." ... "This vegetative reproduction is much easier to use for propagation than by using the spore method."

Qsn #	Question	Answer
	New Zealand Plant Conservation Network. (2016). Flora Details - Asplenium bulbiferum. http://www.nzpcn.org.nz/flora_details.aspx?ID=1520. [Accessed 10 Oct 2016]	[May be possible that plants in Hawaii are sterile since it has not been documented as naturalized] "Easily grown, and popular in cultivation. However, most plants sold as this species are the sterile hybrid A. xlucrosum Perrie et Brownsey (A. bulbliferum x A. dimorphum Kunze). An excellent pot plant but as with all asplenia prone to infestations of scale and mealy bugs."

603	Hybridizes naturally	y
	Source(s)	**Notes**
	Spencer, R. 1995. Horticultural Flora of South-eastern Australia: Ferns, conifers & their allies. UNSW Press, Sydney, AU	"A variable species with a number of subspecies and a known capacity to hybridise. Asplenium bulbiferum X A. oblongifolium 'Maori Princess' was introduced to the trade by Chris Goudey c. 1988. It is a hybrid that occurs in the wild in New Zealand..."
	Brownsey, P.J. & Smith-Dodsworth, J.C. 1989. New Zealanc Ferns and Allied Plants. David Bateman Ltd, Auckland, New Zealand	"A. bulbiferum hybridises with a wide range of other species, especially A. flaccidum, and many of the hybrids are also perpetuated by bulbils."

604	Self-compatible or apomictic	
	Source(s)	**Notes**
	Niranjan, A. R. S., Singh, I. P. & Roy, S. (1983). Mating Systems and Distribution of Some Ferns of Central Himalayas. Proceedings of the Indian National Science Academy B49(6), 722-728	[Unknown. Other Asplenium species capable of selfing] "Asplenium dalhousiae ... This indicated that the species had the capacity of reproducing by intra- and inter-gametophytic selfing."
	Wubs, E. J., de Groot, G. A., During, H. J., Vogel, J. C., Grundmann, M., Bremer, P., & Schneider, H. (2010). Mixed mating system in the fern Asplenium scolopendrium: implications for colonization potential. Annals of Botany, 106, 583–590	[Unknown. Related taxon capable of selfing] "Conclusions The results imply a mixed mating system in A. scolopendrium, with outcrossing when possible and occasional selfing when needed."

605	Requires specialist pollinators	n
	Source(s)	**Notes**
	Mehltreter, K., Walker, L.R. & Sharpe, J.M. 2010. Fern Ecology. Cambridge University Press, Cambridge, UK	[General description] "Ferns and lycophytes ... Fertilization: On gametophyte, sperm cell swims through water"

606	Reproduction by vegetative fragmentation	y
	Source(s)	**Notes**
	Brownsey, P.J. & Smith-Dodsworth, J.C. 1989. New Zealanc Ferns and Allied Plants. David Bateman Ltd, Auckland, New Zealand	"A very common fern usually regognized easily by its bulbils ... which develop directly from cells on the upper surface of the fronds. The bulbils take root as the old frond drops to the ground and grow into new plants."
	Allan, H.H. 1982. Flora of New Zealand, Volume I: Indigenous Tracheophyta - Psilopsida, Lycopsida, Filicopsida, Gymnospermae, Dicotyledons. First electronic edition. Landcare Research, Lincoln, New Zealand	"RHIZOME short, thick; scales without teeth, long pointed. FRONDS tufted, arching, thick, dark green, to 1.5 m long but generally much less. BLADE ovate in outline. divided 2- 3 times, segments with veins extending to each tooth, the segments producing plantlets on the upper surface of ribs towards their tips."

Qsn #	Question	Answer
607	**Minimum generative time (years)**	
	Source(s)	**Notes**
	Cooper, K. M. (1977). Asplenium bulbiferum is non-mycorrhizal. New Zealand Journal of Botany, 15(3), 645-647	"The combination of its extensive root system, copious and long root hairs. and slow growth rate probably enables it to grow without a mycorrhizal association in soils moderately low in available P."
	WRA Specialist. 2016. Personal Communication	Unknown. Slow growth rate, but may be able to reproduce vegetatively before sexual maturity

701	**Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas)**	**n**
	Source(s)	**Notes**
	Allan, H.H. 1982. Flora of New Zealand, Volume I: Indigenous Tracheophyta - Psilopsida, Lycopsida, Filicopsida, Gymnospermae, Dicotyledons. First electronic edition. Landcare Research, Lincoln, New Zealand	"Sori numerous, broad-oblong, submarginal, 2-5 mm. long; indusium firm, obscured by mature sori. Bulbils on veinlets of upper surface, with fronds up to 8 cm. long before falling." [Possibly small spore size can attach to mud on boots, tools or vehicles, but no evidence]

702	**Propagules dispersed intentionally by people**	**y**
	Source(s)	**Notes**
	Jones, D. L. 1987. Encyclopedia of Ferns. Timber Press, Portland, OR	"A very familiar fern which is a popular item of the nursery trade in many countries. Excellent for indoor decoration and makes an impressive basket specimen."

703	**Propagules likely to disperse as a produce contaminant**	
	Source(s)	**Notes**
	Galera, H., & Ratyńska, H. (1999). Greenhouse weeds in the Botanical Garden of PAS in Warsaw-Powsin. Acta Societatis Botanicorum Poloniae, 68(3), 227-236	"In the case of greenhouses, some exotic plants may be undesired too, although they are not usually associated with the term weed. These species arc called greenhouse-escapes here." [Asplenium bulbiferum listed as a greenhouse escape. Possible that plants could become established in other potted plants through bulbils, or spores, if produced]

704	**Propagules adapted to wind dispersal**	**y**
	Source(s)	**Notes**
	Thorsen, M. J., Dickinson, K. J., & Seddon, P. J. (2009). Seed dispersal systems in the New Zealand flora. Perspectives in Plant Ecology, Evolution and Systematics, 11(4): 285-309	Minute spores are wind dispersed

705	**Propagules water dispersed**	
	Source(s)	**Notes**
	New Zealand Plant Conservation Network. (2016). Flora Details - Asplenium bulbiferum. http://www.nzpcn.org.nz/flora_details.aspx?ID=1520. [Accessed 10 Oct 2016]	"Commonly associated with riparian forest, and as a species of base-rich substrates." [Possibly]

Qsn #	Question	Answer
	Brownsey, P.J. & Smith-Dodsworth, J.C. 1989. New Zealand Ferns and Allied Plants. David Bateman Ltd, Auckland, New Zealand	[Could potentially be dispersed by water if growing in riparian habitats] "A very common fern usually recognized easily by its bulbils ... which develop directly from cells on the upper surface of the fronds. The bulbils take root as the old frond drops to the ground and grow into new plants." ... "Likes damp, shaded places with plenty of humus. Easily propagated from the bulbils if they are planted in humus."

706	Propagules bird dispersed	n
	Source(s)	**Notes**
	Thorsen, M. J., Dickinson, K. J., & Seddon, P. J. (2009). Seed dispersal systems in the New Zealand flora. Perspectives in Plant Ecology, Evolution and Systematics, 11(4): 285-309	Minute spores are wind dispersed [No evidence]

707	Propagules dispersed by other animals (externally)	n
	Source(s)	**Notes**
	Allan, H.H. 1982. Flora of New Zealand, Volume I: Indigenous Tracheophyta - Psilopsida, Lycopsida, Filicopsida, Gymnospermae, Dicotyledons. First electronic edition. Landcare Research, Lincoln, New Zealand	"Sori numerous, broad-oblong, submarginal, 2-5 mm. long; indusium firm, obscured by mature sori. Bulbils on veinlets of upper surface, with fronds up to 8 cm. long before falling." [Possibly small spore size can attach to mud on animals, or in fur, but no evidence]

708	Propagules survive passage through the gut	
	Source(s)	**Notes**
	Timmins, S. M. (2002). Impact of cattle on conservation land licensed for grazing in South Westland, New Zealand. New Zealand Journal of Ecology, 26(2): 107-120	[Unknown if viable spores can survive gut passage after consumption by animals, but unlikely to be an important dispersal mechanism] "Some plant species appeared to be highly palatable to cattle and only occurred on sites without cattle. Such species included pate (Schefflera digitata), broadleaf (Griselinia littoralis), pigeonwood (Hedycarya arborea), supplejack (Ripogonum scandens), mahoe (Melicytus ramiflorus), milk tree (Streblus heterophyllus), lancewood (Pseudopanax crassifolius) and hen and chickens fern (Asplenium bulbiferum)."

801	Prolific seed production (>1000/m2)	
	Source(s)	**Notes**
	New Zealand Plant Conservation Network. (2016). Flora Details - Asplenium bulbiferum. http://www.nzpcn.org.nz/flora_details.aspx?ID=1520. [Accessed 10 Oct 2016]	[Unknown] "Commonly sold by many plant nurseries. However some plants sold as this species are in fact a sterile hybrid A. x lucrosum (A. bulbiferum x A. dimorphum). "

Qsn #	Question	Answer
802	**Evidence that a persistent propagule bank is formed (>1 yr)**	
	Source(s)	**Notes**
	WRA Specialist. 2016. Personal Communication	Unknown

803	**Well controlled by herbicides**	
	Source(s)	**Notes**
	WRA Specialist. 2016. Personal Communication	Unknown. No information on herbicide efficacy or chemical control of this species

804	**Tolerates, or benefits from, mutilation, cultivation, or fire**	
	Source(s)	**Notes**
	Hicks Nurseries. (2016). Hen and Chicken Fern - Asplenium bulbiferum. http://plants.hicksnurseries.com/. [Accessed 10 Oct 2016]	[Tolerates pruning. May be able to regenerate from rhizomes] "This is a relatively low maintenance annual bedding plant, and usually looks its best without pruning, although it will tolerate pruning."

805	**Effective natural enemies present locally (e.g. introduced biocontrol agents)**	
	Source(s)	**Notes**
	WRA Specialist. 2016. Personal Communication	Unknown

Summary of Risk Traits:

High Risk / Undesirable Traits
• Grows in subtropical climates
• Described as a greenhouse escape
• Shade tolerant
• Tolerates many soil types
• Reproduces by spores & vegetatively by bulbils
• Hybridizes with other Asplenium species
• Spores wind & possibly water-dispersed; water may be able to disperse bulbils

Low Risk Traits
• No reports of invasiveness or naturalization
• Unarmed (no spines, thorns or burrs)
• Palatable to browsing & grazing animals
• Non-toxic
• Ornamental

Second Screening Results for Herbs of Low Stature Shrubby Life Forms

(A) Reported as a weed of cultivate lands? No
Outcome = Accept (Low Risk)