

Citation:

Zachariades, C. (2018) Biological control of invasive alien plants in South Africa: a list of all insects, mites and pathogens released as biological control agents from 1913-2018. <http://www.arc.agric.za/arc-ppri/Documents/Table2-NaturalEnemiesReleased.pdf>

Table 2. Target weed species in South Africa, their region of origin and degree of biological control achieved (see below for definitions): **natural enemies released**, or for which a release permit has been obtained, their feeding guilds or association with the host plant, year of release, establishment, and degree of agent damage to the weed (if established) (see below for definitions), and key references for each (see separate references document). Winston et al. (2014) was consulted for some sources of agents.

Scientific name and author Common name Region of origin	Degree of control	Natural enemy	Feeding guild	Agent research status	Damage inflicted	Source of agent	Key references
ARACEAE							
<i>Pistia stratiotes</i> L. water lettuce South America	Complete	<i>Neohydronomus affinis</i> Hustache (Coleoptera: Curculionidae)	Leaf and stem borer	Released 1985, established	Extensive	Brazil via Australia	Cilliers 1991; Coetzee et al 2011b
ASTERACEAE							
<i>Ageratina adenophora</i> (Spreng.) R.M.King & H.Rob. (= <i>Eupatorium adenophorum</i> Spreng.) crofton weed Central America	Negligible	<i>Passalora ageratinae</i> Crous & A.R. Wood (= " <i>Phaeoramularia</i> " sp.) (anamorphic fungus; Mycosphaerellales: Mycosphaerellaceae)	Leaf spot pathogen	Released 1987, established	Moderate	Prob. Central America, prob. via Hawaii (USA), via Australia	Morris 1989, 1991; Buccellato et al. 2012
		<i>Procecidochares utilis</i> Stone (Diptera: Tephritidae)	Stem galler	Released 1984, established	Moderate	Mexico	Kluge 1991; Erasmus et al. 1992; Buccellato et al. 2012
<i>Ageratina riparia</i> (Regel) R.M.King & H.Rob. (= <i>Eupatorium riparium</i> Regel) mistflower Central America	Complete	<i>Entyloma ageratinae</i> R.W. Barreto & H.C. Evans (Entylomatales: Entylomataceae)	Leaf pathogen	Released 1989, established	Considerable	Jamaica via Hawaii (USA)	Morris 1991
<i>Campuloclinium macrocephalum</i> (Less.) DC. (formerly <i>Eupatorium macrocephalum</i> Less.) pompom weed South America	Negligible	<i>Cochylis campuloclinium</i> Brown (Lepidoptera: Tortricidae)	Flower feeder	Release permit issued		Argentina	Brown 2006; McConnachie et al. 2011
		<i>Liothrips tractabilis</i> Mound & Pereyra (Thysanoptera: Thripidae)	Stem galler	Released 2013, established	Moderate	Argentina	Mound & Pereyra 2008; McConnachie et al. 2011
		<i>Puccinia eupatorii</i> Dietel (Pucciniales: Pucciniaceae)	Leaf rust pathogen	Not released, occurs locally	Moderate		McConnachie et al. 2011; Retief et al. 2016

<i>Chromolaena odorata</i> (L.) R.M.King & H. Rob. (formerly <i>Eupatorium odoratum</i> L.) triffid weed North, Central & South America	Substantial	<i>Calycomyza eupatorivora</i> Spencer (Diptera: Agromyzidae)	Leaf miner	Released 2003, established	Trivial	Jamaica	Zachariades et al. 2002; Strathie et al. 2007; Zachariades et al. 2011b; Nzama et al. 2014a&b
		<i>Dichrorampha odorata</i> Brown & Zachariades (Lepidoptera: Tortricidae)	Stem-tip galler	Released 2013, establishment unconfirmed		Jamaica	Brown & Zachariades 2007, Dube et al. 2017
		<i>Lixus aemulus</i> Petri (Coleoptera: Curculionidae)	Stem borer	Released 2011, establishment unconfirmed		Acre state, Brazil	Zachariades et al. 2002; Kluge & Zachariades 2006
		<i>Pareuchaetes aurata</i> (Butler) (Lepidoptera: Erebidae)	Leaf feeder	Released 1990, not established		North-western Argentina	Kluge & Caldwell 1993a; Zachariades et al. 1999
		<i>Pareuchaetes insulata</i> (Walker) (Lepidoptera: Erebidae)	Leaf feeder	Released 2001, established	Extensive, localised	Florida, USA; Jamaica; Cuba	Kluge & Caldwell 1993b; Strathie & Zachariades 2004; Strathie et al. 2007; Zachariades et al. 2011b; Dube et al 2009, 2014; Uyi et al. 2014 a&b, 2015, 2016a&b, 2017, Zachariades et al. 2016
		<i>Pareuchaetes pseudoinsulata</i> Rego Barros (Lepidoptera: Erebidae)	Leaf feeder	Released 1989 & 1998, not established		Trinidad via USA; Trinidad via Indonesia; Northern Venezuela	Strathie & Zachariades 2002; Zachariades et al. 2011b
		<i>Recchia parvula</i> (Lane) (Coleoptera: Cerambycidae)	Stem and crown borer	Released 2016, establishment unconfirmed		North-western Argentina	Zachariades et al. 2007; Zachariades et al. 2011b
<i>Cirsium vulgare</i> (Savi) Ten. spear thistle Europe	Negligible	<i>Rhinocyllus conicus</i> (Froelich) (Coleoptera: Curculionidae)	Seed feeder	Released 1984, 1986, established	Moderate	France	Zimmermann 1991; Hodson et al. 2003
		<i>Urophora stylata</i> (Fabricius) (Diptera: Tephritidae)	Seed feeder	Released 1984, 1987, 1989, 1990, not established		Germany, France	Zimmermann 1991
<i>Parthenium hysterophorus</i> L. parthenium Caribbean	Under evaluation	<i>Listronotus setosipennis</i> (Hustache) (Coleoptera: Curculionidae)	Stem borer	Released 2013, established	Considerable	Argentina	Dhileepan & Strathie 2009; Strathie et al. 2011
		<i>Puccinia abrupta</i> var. <i>parthenicola</i> (Jack. & Holw.) (Pucciniales: Pucciniaceae)	Leaf rust pathogen	Not released, occurs locally	Moderate	Unknown origin	Wood & Scholler 2002; Dhileepan & Strathie 2009
		<i>Puccinia xanthii</i> Schwein. var. <i>parthenii-hysterophorae</i> Seier, H.C. Evans & Á. Romero (= <i>P. melampodii</i> ; Pucciniales: Pucciniaceae)	Leaf rust pathogen	Released 2010, established	Considerable	Australia (originally Mexico)	Dhileepan & Strathie 2009; Strathie et al. 2011
		<i>Smicronyx lutulentus</i> Dietz (Coleoptera: Curculionidae)	Seed feeder	Released 2015, established.	Unknown	Australia (originally Mexico)	Dhileepan & Strathie 2009; Strathie et al. 2011
		<i>Zygotogramma bicolorata</i> Pallister (Coleoptera: Chrysomelidae: Cassidinae)	Leaf feeder	Released 2013, established	Considerable	Australia (originally Mexico)	Dhileepan & Strathie 2009; Strathie et al. 2011; McConnachie 2015a; Chidawanyika et al. 2017

<i>Silybum marianum</i> (L.) Gaertn. milk thistle Mediterranean, Asia	Not determined	<i>Rhinocyllus conicus</i> (Froelich) (Coleoptera: Curculionidae)	Seed feeder	Alternative host, released 1985, not established		California, USA	Zimmermann 1991	
<i>Tithonia diversifolia</i> (Hemsl.) A.Gray Mexican sunflower Central America	Not applicable	<i>Physonota maculiventris</i> (Coleoptera: Chrysomelidae: Cassidinae)	Leaf feeder	Release permit issued		Mexico	Mphephu et al. 2017	
<i>Tithonia rotundifolia</i> (Mill.) S.F.Blake red sunflower Central America	Under evaluation	<i>Zygogramma piceicollis</i> (Stål) (Coleoptera: Chrysomelidae: Chrysomelinae)	Leaf feeder	Released 2015, established	Considerable, localised	Mexico	Simelane et al. 2011b	
		<i>Zygogramma signatipennis</i> (Stål) (Coleoptera: Chrysomelidae: Chrysomelinae)	Leaf feeder	Released 2015, established	Considerable, localised	Mexico	Simelane et al. 2011b	
AZOLLACEAE								
<i>Azolla cristata</i> Kaulf. Carolina water fern North and South America	Complete	<i>Stenopelmus rufinasus</i> Gyllenhal (Coleoptera: Curculionidae)	Fronnd feeder	Alternative host, released 1997, established	Extensive	USA	Madeira et al. 2016	
<i>Azolla filiculoides</i> Lam. red water fern South America	Complete	<i>Stenopelmus rufinasus</i> Gyllenhal (Coleoptera: Curculionidae)	Fronnd feeder	Released 1997, established	Extensive	USA	McConnachie et al.2004; Hill et al. 2008; Coetzee et al. 2011b	
BASELLACEAE								
<i>Anredera cordifolia</i> (Ten.) Steenis subsp. <i>cordifolia</i> Madeira vine South America	Under evaluation	<i>Plectonycha correntina</i> Lacordaire (Coleoptera: Chrysomelidae: Chrysomelinae)	Leaf feeder	Released 2016, established	Trivial	Buenos Aires, Argentina	Cagnotti et al. 2007; Van der Westhuizen 2011	
BIGNONIACEAE								
<i>Dolichandra unguis-cati</i> (L.) Lohman (formerly <i>Macfadyena unguis-cati</i> (L.) A.H.Gentry) cat's claw creeper Central and South America	Negligible	<i>Carvalhotingis hollandi</i> Drake (Hemiptera: Tingidae)	Leaf sucker	Released 2007, established	Unknown	Misiones, Argentina	Williams et al. 2008	
		<i>Carvalhotingis visenda</i> Drake & Hambleton (Hemiptera: Tingidae)	Leaf sucker	Released 2007, established	Moderate	Misiones, Argentina	Williams et al. 2008	
		<i>Cercosporella dolichandrae</i> Crous & den Breeÿen (Mycosphaerellales: Mycosphaerellaceae)	Leaf spot pathogen	Not released, occurs locally; also under investigation	Moderate			
		<i>Charidotis auroguttata</i> Boheman (Coleoptera: Chrysomelidae: Cassidinae)	Leaf feeder	Released 1999, established	Trivial	Miranda, Venezuela	Sparks 1999; Williams 2002	
		<i>Hedwigiella jureceki</i> (Obenberger) (Coleoptera: Buprestidae)	Leaf miner	Released 2007, established	Trivial	Misiones, Argentina	King et al. 2011b	
		<i>Hypocosmia pyrochroma</i> Jones (Lepidoptera: Pyralidae)	Leaf feeder	Released 2010, establishment unconfirmed			Misiones, Argentina	Dhileepan et al. 2007; King et al. 2011b

<i>Tecoma stans</i> (L.) Juss ex Kunth var. <i>stans</i> yellow bells North and Central America	Under evaluation	<i>Mada polluta</i> (Mulsant) (Coleoptera: Coccinellidae)	Leaf feeder	Released 2013, established	Moderate	Guerrero, Mexico	Madire et al. 2011a; Madire 2013
		<i>Prospodium transformans</i> (Ellis & Everh.) Cummins (Pucciniales: Uropyxidaceae)	Leaf rust pathogen	Released 2010, not established		Mexico	Wood 2008; Madire et al. 2011a
		<i>Pseudonapomyza</i> sp. (Diptera: Agromyzidae)	Leaf miner	Released 2014, established	Trivial	San Pedro, Argentina	Madire 2009/10; Madire et al. 2011a,b
CACTACEAE							
<i>Austrocylindropuntia subulata</i> (Muehlenpf.) Backeb. (= <i>Opuntia exaltata</i> (Berger)) long spine cactus South America	Not determined	<i>Cactoblastis cactorum</i> (Berg) (Lepidoptera: Pyralidae)	Cladode borer	Alternative host, established	Unknown	Argentina via Australia	Moran & Zimmermann 1991b
<i>Cereus jamacaru</i> DC. and <i>C. hildmannianus</i> K.Schum. queen of the night South America	Complete	<i>Hypogeococcus festerianus</i> (Lizer y Trelles) (Hemiptera: Pseudococcidae)	Stem sucker	Alternative host, established	Extensive	Argentina via Australia	Moran & Zimmermann 1991b; Klein 1999; Paterson et al. 2011
		<i>Nealcidion cereicola</i> (Fisher) [formerly in <i>Alcidion</i>] (Coleoptera: Cerambycidae)	Stem borer	Alternative host, released 1990, established	Considerable	Argentina via Australia	Klein 1999
<i>Cylindropuntia fulgida</i> (Engelm.) F.M.Knuth var. <i>fulgida</i> Zim chain-fruit cholla North and Central America	Complete	<i>Dactylopius tomentosus</i> (Lamarck), 'cholla' biotype (Hemiptera: Dactylopiidae)	Cladode sucker	Released 2008, established	Extensive	Mexico (Baja California)	Mathenge et al. 2009a,b, 2010a,b; Paterson et al. 2011
		<i>Dactylopius tomentosus</i> (Lamarck), 'imbricata' biotype (Hemiptera: Dactylopiidae)	Cladode sucker	Alternative host, released 1970, established	Trivial	South-Western USA via Australia	Moran & Zimmermann 1991b
<i>Cylindropuntia fulgida</i> (Engelm.) F.M.Knuth var. <i>mamillata</i> (Engelm.) Backeb. boxing-glove cactus North and Central America	Complete	<i>Dactylopius tomentosus</i> (Lamarck), 'cholla' biotype (Hemiptera: Dactylopiidae)	Cladode sucker	Released 2008, established	Extensive	Mexico (Baja California)	
<i>Cylindropuntia imbricata</i> (Haw.) F.M.Knuth imbricate prickly pear North and Central America	Substantial	<i>Dactylopius tomentosus</i> (Lamarck), 'imbricata' biotype (Hemiptera: Dactylopiidae)	Cladode sucker	Released 1970, established	Considerable	South-Western USA via Australia	Moran & Zimmermann 1991b; Mathenge et al. 2009a
		<i>Metamasius spinolae</i> (Gyllenhal) (Coleoptera: Curculionidae)	Stem borer	Alternative host, released 1974, not established		Mexico	Moran & Zimmermann 1991b
<i>Cylindropuntia leptocaulis</i> (DC.) F.M.Knuth pencil cactus North and Central America	Complete	<i>Dactylopius tomentosus</i> (Lamarck) ('imbricata' biotype) (Hemiptera: Dactylopiidae)	Cladode sucker	Alternative host, released 1977, established	Extensive	South-Western USA via Australia	Moran & Zimmermann 1991b; Mathenge et al. 2009a

<i>Harrisia bonplandii</i> (Parm.) Britton & Rose (= <i>H. balansae</i> (K.Schum.) N.P.Taylor & Zappi) angular cactus, strangler cactus South America	Substantial	<i>Hypogeococcus festerianus</i> (Lizer y Trelles) (Hemiptera: Pseudococcidae)	Stem sucker	Alternative host, released 2006, established	Considerable	Argentina via Australia		
<i>Harrisia martinii</i> (Labour.) moon cactus South America	Complete	<i>Hypogeococcus festerianus</i> (Lizer y Trelles) (Hemiptera: Pseudococcidae)	Stem sucker	Released 1983, established	Extensive	Argentina via Australia	Moran & Zimmermann 1991b; Klein 1999	
		<i>Nealcidion cereicola</i> Fisher [formerly in <i>Alcidion</i>] (Coleoptera: Cerambycidae)	Stem borer	Released 1990, established	Considerable	Argentina via Australia	Klein 1999	
<i>Harrisia pomanensis</i> (F.A.C.Weber) Britton & Rose midnight lady, devil's rope cactus South America	Substantial	<i>Hypogeococcus festerianus</i> (Lizer y Trelles) (Hemiptera: Pseudococcidae)	Stem sucker	Alternative host, released 2013, established	Considerable	Argentina via Australia		
<i>Harrisia tortuosa</i> (J.Forbes ex Otto & A.Dietr.) Britton & Rose spiny snake cactus South America	Substantial	<i>Hypogeococcus festerianus</i> (Lizer y Trelles) (Hemiptera: Pseudococcidae)	Stem sucker	Alternative host, released 2014, established	Considerable	Argentina via Australia		
<i>Hylocereus undatus</i> (Haw.) Britton & Rose dragon fruit Tropical America	Not determined	<i>Hypogeococcus festerianus</i> (Lizer y Trelles) (Hemiptera: Pseudococcidae)	Stem sucker	Alternative host, established	Unknown	Argentina via Australia		
<i>Opuntia aurantiaca</i> Lindl. jointed cactus South America	Substantial	<i>Cactoblastis cactorum</i> (Berg) (Lepidoptera: Pyralidae)	Cladode borer	Alternative host, established	Moderate	Argentina via Australia	Moran & Annecke 1979; Moran & Zimmermann 1991a; Zimmermann et al. 2004	
		<i>Dactylopius austrinus</i> De Lotto (Hemiptera: Dactylopiidae)	Cladode sucker	Released 1935, established	Extensive	Central & Western Argentina via Australia	Moran & Annecke 1979; Moran & Zimmermann 1991a	
		<i>Mimorista pulchellalis</i> Dyar (Lepidoptera: Crambidae)	Cladode borer	Released 1979, not established			Argentina (Parana)	Moran & Zimmermann 1991a
		<i>Nanaia</i> sp. (Lepidoptera: Pyralidae)	Cladode borer	Released 1983, not established			Peru	Moran & Zimmermann 1991a
		<i>Zophodia tapiacola</i> (Dyar) [formerly in <i>Tucumania</i>] (Lepidoptera: Pyralidae)	Cladode borer	Released 1976 & 1982, not established			Argentina (Formosa & Buenos Aires Provinces)	Moran & Zimmermann 1991a
<i>Opuntia engelmannii</i> Salm-Dyck ex Engelm. (= <i>O. lindheimeri</i> , <i>O. tardospina</i>) small round-leaved prickly pear North and Central America	Negligible to substantial, depending on variety	<i>Cactoblastis cactorum</i> (Berg) (Lepidoptera: Pyralidae)	Cladode borer	Alternative host, released 1938, established	Trivial on large plants, moderate on small plants	Argentina via Australia		
		<i>Dactylopius opuntiae</i> (Cockerell), 'ficus' biotype (Hemiptera: Dactylopiidae)	Cladode sucker	Alternative host, released 1938, established	Moderate to trivial, depending on climate & plant variety	USA (Texas, Arizona) via Australia	Moran & Zimmermann 1991b	

		<i>Dactylopius opuntiae</i> (Cockerell), 'stricta' biotype (Hemiptera: Dactylopiidae)	Cladode sucker	Alternative host, released 2012, established	Extensive, in combination with pathogen	Via Australia	
<i>Opuntia ficus-indica</i> (L.) Mill. mission prickly pear, sweet prickly pear Central America	Substantial	<i>Cactoblastis cactorum</i> (Berg) (Lepidoptera: Pyralidae)	Cladode borer	Released 1933, established	Extensive	Argentina via Australia	Annecke & Moran 1978; Zimmermann & Moran 1991
		<i>Dactylopius opuntiae</i> (Cockerell), 'ficus' biotype (Hemiptera: Dactylopiidae)	Cladode sucker	Released 1938, established	Extensive	USA (Texas, Arizona) via Australia	Annecke & Moran 1978; Zimmermann & Moran 1991
		<i>Lagocheirus funestus</i> (Thompson) [formerly in <i>Archlagocheirus</i>] (Coleoptera: Cerambycidae)	Stem borer	Released 1943, established	Trivial	Mexico via Australia	Annecke & Moran 1978; Zimmermann & Moran 1991
		<i>Metamasius spinolae</i> (Gyllenhal) (Coleoptera: Curculionidae)	Stem borer	Released 1948, established	Extensive	Mexico	Zimmermann & Moran 1991
<i>Opuntia humifusa</i> (Raf.) Raf. creeping prickly pear, large-flowered prickly pear North America	Complete	<i>Dactylopius opuntiae</i> (Cockerell), Australian ('stricta') biotype (Hemiptera: Dactylopiidae)	Cladode sucker	Alternative host, established	Considerable in hot, arid regions, moderate in cooler regions & Highveld	Via Australia	
<i>Opuntia monacantha</i> Haw. smooth/drooping prickly pear South America	Complete	<i>Cactoblastis cactorum</i> (Berg) (Lepidoptera: Pyralidae)	Cladode borer	Alternative host, established	Considerable	Argentina via Australia	Moran & Zimmermann 1991b; Zimmermann et al. 2009
		<i>Dactylopius ceylonicus</i> (Green) (Hemiptera: Dactylopiidae)	Cladode sucker	Released 1913, established	Extensive	Temperate South America, Brazil via Sri Lanka	Moran & Zimmermann 1991b; Zimmermann et al. 2009
<i>Opuntia salmiana</i> J.Parm. ex Pfeiff. bur cactus South America	Negligible	<i>Cactoblastis cactorum</i> (Berg) (Lepidoptera: Pyralidae)	Cladode borer	Alternative host, established	Trivial to moderate	Argentina via Australia	Moran & Zimmermann 1991b
<i>Opuntia spinulifera</i> Salm-Dyck large round-leaved prickly pear Central America	Not determined	<i>Cactoblastis cactorum</i> (Berg) (Lepidoptera: Pyralidae)	Cladode borer	Alternative host, established	Unknown	Argentina via Australia	Moran & Zimmermann 1991b
<i>Opuntia stricta</i> (Haw.) Haw. Australian pest pear North America and Caribbean	Substantial	<i>Cactoblastis cactorum</i> (Berg) (Lepidoptera: Pyralidae)	Cladode borer	Alternative host, released 1980s, established	Extensive	Argentina via Australia	Hoffmann et al. 1999
		<i>Dactylopius opuntiae</i> (Cockerell), Australian ('stricta') biotype (Hemiptera: Dactylopiidae)	Cladode sucker	Released 1997, established	Extensive	North America via Australia	Hoffmann et al. 1999; Paterson et al. 2011
<i>Opuntia tomentosa</i> Salm-Dyck velvet opuntia, velvet tree-pear Mexico and Guatemala	Substantial but localised	<i>Dactylopius opuntiae</i> (Cockerell), 'ficus' biotype (Hemiptera: Dactylopiidae)	Cladode sucker	Alternative host, released 1938, established	Extensive	USA (Texas, Arizona) via Australia	
<i>Peniocereus serpentinus</i> (Lag. & Rodr.) N.P. Taylor serpent cactus Mexico	Not determined	<i>Hypogeococcus festerianus</i> (Lizer y Trelles) (Hemiptera: Pseudococcidae)	Stem sucker	Alternative host, established	Unknown	Argentina via Australia	

<i>Pereskia aculeata</i> Mill. Barbados gooseberry, pereskia South America and Caribbean	Under evaluation	<i>Catorhintha schaffneri</i> Brailovsky & Garcia (Hemiptera: Coreidae)	Stem wilter	Released 2014, established	Unknown	Santa Catarina, Brazil	Paterson et al. 2014a,b
		<i>Phenrica guerini</i> Bechyné (Coleoptera: Chrysomelidae: Galerucinae)	Leaf feeder	Released 1991 & 1995, established	Extensive locally	Rio de Janeiro, Brazil	Klein 1999; Paterson et al. 2011, 2012
CLUSIACEAE							
<i>Hypericum perforatum</i> L. St John's wort Europe and Asia	Complete	<i>Agrilus (Spiragrilus) hyperici</i> (Creutzer) (Coleoptera: Buprestidae)	Root borer	Released 1974-1979, not established		France via Australia & California (USA)	Gordon & Kluge 1991
		<i>Aphis chloris</i> Koch (Hemiptera: Aphididae)	Sap sucker	Released 1982, not established		Germany via Canada	Gordon & Kluge 1991
		<i>Aplocera efformata</i> (Guenée) (Lepidoptera: Geometridae)	Leaf feeder	Released 1983, not established		France via Australia	Gordon & Kluge 1991
		<i>Chrysolina hyperici</i> (Forster) (Coleoptera: Chrysomelidae: Chrysomelinae)	Leaf feeder	Released 1960-1973, not established		England via Australia (1960); England via Australia via USA via Canada (1973)	Gordon & Kluge 1991
		<i>Chrysolina quadrigemina</i> Suffrian (Coleoptera: Chrysomelidae: Chrysomelinae)	Leaf feeder	Released 1960-1973, established	Extensive	France via Australia	Gordon & Kluge 1991
		<i>Zeuxidiplosis giardi</i> (Kieffer) (Diptera: Cecidomyiidae)	Shoot-tip galler	Released 1972, established	Moderate	France via California (USA) via Australia	Gordon & Kluge 1991
COMMELINACEAE							
<i>Tradescantia fluminensis</i> Vell. wandering Jew, spiderwort South America	Not applicable	<i>Neolema abbreviata</i> (Lacordaire) (Coleoptera: Chrysomelidae: Criocerinae)	Shoot-tip and leaf feeder	Release permit issued		Brazil via New Zealand	Fowler et al., 2013
CONVOLVULACEAE							
<i>Convolvulus arvensis</i> L. field bindweed Europe and Asia	Not applicable	<i>Aceria malherbae</i> Nuzzaci (Acari: Trombidiformes: Eriophyidae)	Leaf galler	Released 1994, not established		Greece	Craemer 1995
		<i>Septoria</i> sp. (anamorphic fungus; Mycosphaerellales: Mycosphaerellaceae)	Leaf spot pathogen	Not released, occurs locally; rejected	Trivial		
FABACEAE							
<i>Acacia baileyana</i> F.Muell. Bailey's wattle Australia	Negligible	<i>Dasineura pilifera</i> Kolesik (Diptera: Cecidomyiidae)	Flower galler	Released 2016, established	Unknown	Victoria, Australia	
		<i>Melanterius maculatus</i> Lea (Coleoptera: Curculionidae)	Seed feeder	Alternative host, released 2006 & 2009, established	Moderate	NSW, Australia	Dennill et al. 1999; Impson et al. 2009, 2011
<i>Acacia cyclops</i> A.Cunn. ex G.Don red eye, rooikrans Australia	Substantial	<i>Calonectria scoparia</i> Ribeiro & Matsuoka ex Peerally (Hypocreales: Nectriaceae) (anamorphic fungus: <i>Cylindrocladium candelabrum</i>)	Leaf spot pathogen	Not released, occurs locally; rejected	Trivial		

		<i>Dasineura dielsi</i> Rübssaamen (Diptera: Cecidomyiidae)	Flower galler	Released 2002, established	Extensive	WA, Australia	Adair 2005; Impson et al. 2009, 2011
		<i>Melanterius servulus</i> Pascoe (Coleoptera: Curculionidae)	Seed feeder	Alternative host, released 1991 & 1994, established	Considerable	WA, Australia	Dennill et al. 1999; Impson et al. 2009, 2011
		<i>Pseudolagarobasidium acaciicola</i> Ginns (Polyporales: Phanerochaetaceae)	Die-back pathogen	Not released, occurs locally; under investigation	Considerable		Wood & Ginns 2006, Kotzé et al. 2015
<i>Acacia dealbata</i> Link silver wattle Australia	Negligible	<i>Dasineura pilifera</i> Kolesik (Diptera: Cecidomyiidae)	Flower galler	Released 2016, established	Unknown	Victoria, Australia	
		<i>Melanterius maculatus</i> Lea (Coleoptera: Curculionidae)	Seed feeder	Alternative host, released 1994-2007, established	Moderate	Australia	Dennill et al. 1999; Impson et al. 2009, 2011
<i>Acacia decurrens</i> (Wendl.) Willd. green wattle Australia	Negligible	<i>Dasineura pilifera</i> Kolesik (Diptera: Cecidomyiidae)	Flower galler	Release permit issued		Victoria, Australia	
		<i>Melanterius maculatus</i> Lea (Coleoptera: Curculionidae)	Seed feeder	Alternative host, released 2000-2007, established	Moderate	Victoria, Australia	Dennill et al. 1999; Impson et al. 2009, 2011
<i>Acacia longifolia</i> (Andr.) Willd. long-leaved wattle Australia	Substantial	<i>Melanterius ventralis</i> Lea (Coleoptera: Curculionidae)	Seed feeder	Released 1985, established	Extensive	Australia	Dennill & Donnelly 1991; Dennill et al. 1999; Impson et al. 2009, 2011
		<i>Trichilogaster acaciaelongifoliae</i> (Froggatt) (Hymenoptera: Pteromalidae)	Bud galler	Released 1982, established	Extensive	Australia	Dennill & Donnelly 1991; Dennill et al. 1999; Impson et al. 2009
<i>Acacia mearnsii</i> De Wild. black wattle Australia	Substantial	<i>Ceratocystis albofundus</i> M.J.Wingf., De Beer & M.J.Morris (Microascales: Ceratocystidaceae)	Gummosis pathogen	Not released, occurs locally; shelved	Moderate, localised		Morris et al. 1999
		<i>Cylindrobasidium laeve</i> (Pers.) Chamuris (Polyporales: Physalacriaceae)	Early succession wood rot pathogen, prevents coppice growth	Not released, occurs locally; developed as cut stump inoculant "Stumpout"	Extensive when applied according to label instructions		Morris et al. 1999
		<i>Dasineura rubiformis</i> Kolesik (Diptera: Cecidomyiidae)	Flower galler	Present before release, established	Extensive in WC, Moderate EC, Trivial MP & KZN	Australia	Adair 2004; Impson et al. 2008, 2009, 2011
		<i>Melanterius maculatus</i> Lea (Coleoptera: Curculionidae)	Seed feeder	Released 1993-1996, established	Moderate	NSW, ACT, Australia	Dennill et al. 1999; Impson et al. 2009, 2011
<i>Acacia melanoxylon</i> R.Br. Australian blackwood Australia	Substantial	<i>Melanterius acaciae</i> Lea (Coleoptera: Curculionidae)	Seed feeder	Released 1986, established	Extensive	Australia	Dennill et al. 1999; Impson et al. 2009, 2011
<i>Acacia podalyriifolia</i> A.Cunn. ex G.Don. pearl acacia Australia	Negligible	<i>Melanterius maculatus</i> Lea (Coleoptera: Curculionidae)	Seed feeder	Alternative host, released 2008, established	Moderate but localised	QLD, Australia	Dennill et al. 1999; Impson et al. 2009, 2011

<i>Acacia pycnantha</i> Benth. golden wattle Australia	Substantial	<i>Cylindrobasidium laeve</i> (Pers.) Chamuris (Polyporales: Physalacriaceae)	Early succession wood rot fungus	Alternative host; not released, occurs locally; developed as cut stump inoculant "Stumpout", but never used	Extensive when applied according to label instructions		Morris et al. 1999
		<i>Melanterius maculatus</i> Lea (Coleoptera: Curculionidae)	Seed feeder	Alternative host, released 2005-2007, established	Moderate	SA, Vic, Australia	Dennill et al. 1999; Impson et al. 2009, 2011
		<i>Trichilogaster signiventris</i> (Girault) (Hymenoptera: Pteromalidae)	Bud galler	Released 1987 & 1992, established	Considerable/ Extensive	Australia	Hoffmann et al. 2002; Impson et al. 2009, 2011
<i>Acacia saligna</i> (Labill.) H.L.Wendl. Port Jackson willow Australia	Substantial	<i>Melanterius compactus</i> Lea (Coleoptera: Curculionidae)	Seed feeder	Released 2001 & 2003, established	Considerable	WA, Australia	Dennill et al. 1999; Impson et al. 2009, 2011
		<i>Uromycladium morrisii</i> Doungsa-ard, McTaggart, Geering & R.G. Shivas (Pucciniales: Pileolariaceae)	Gall former	Released 1987, established	Extensive	WA, Australia	Morris 1987, 1991, 1997, 1999; Wood & Morris 2007
<i>Caesalpinia decapetala</i> (Roth) Alston Mauritius thorn Asia	Negligible	<i>Sulcobruchus subsuturalis</i> (Pic) (Coleoptera: Chrysomelidae: Bruchinae)	Seed feeder	Released 1999, established	Trivial	India	Coetzer & Nesar 1999; Coetzer 2000; Byrne et al. 2011
<i>Gleditsia triacanthos</i> L. honey locust North America	Not determined	<i>Megabruchidius tonkineus</i> (Pic) (Coleoptera: Chrysomelidae: Bruchinae)	Seed feeder	Not released, occurs locally	Unknown		
<i>Leucaena leucocephala</i> (Lam.) de Wit leucaena Tropical America	Negligible	<i>Acanthoscelides macrophthalmus</i> (Schaeffer) (Coleoptera: Chrysomelidae: Bruchinae)	Seed feeder	Released 1999, established	Trivial	Mexico	Shoba & Olckers 2010; Olckers 2011a; Sharratt & Olckers 2012
<i>Paraserianthes lophantha</i> (Willd.) Nielsen (formerly <i>Albizia lophantha</i> Willd.) stink bean Australia	Substantial	<i>Melanterius servulus</i> Pascoe (Coleoptera: Curculionidae)	Seed feeder	Released 1989, established	Considerable	Australia	Dennill et al. 1999; Impson et al. 2009, 2011
		<i>Uromycladium woodii</i> Doungsa-ard, McTaggart, Geering & R.G. Shivas (Pucciniales: Pileolariaceae)	Gall former	Released 2016, established	Unknown	WA, Australia	
<i>Prosopis</i> L. species mesquite, prosopis North and Central America	Negligible	<i>Algarobius bottimeri</i> Kingsolver (Coleoptera: Chrysomelidae: Bruchinae)	Seed feeder	Released 1990, not established		South-western USA	Impson et al. 1999
		<i>Algarobius prosopis</i> (LeConte) (Coleoptera: Chrysomelidae: Bruchinae)	Seed feeder	Released 1987, established	Considerable	Arizona, USA	Hoffmann et al. 1993; Impson et al. 1999; Roberts 2006; Van Klinken et al. 2009; Zachariades et al. 2011a
		<i>Neltumius arizonensis</i> (Schaeffer) (Coleoptera: Chrysomelidae: Bruchinae)	Seed feeder	Released 1993, established	Unknown	Arizona, USA	Coetzer & Hoffmann 1997; Impson et al. 1999; Strathie 1995

<i>Sesbania punicea</i> (Cav.) Benth. red sesbania South America	Complete	<i>Neodiplogrammus quadrivittatus</i> (Olivier) (Coleoptera: Curculionidae)	Stem borer	Released 1984, established	Extensive	Argentina (Buenos Aires Prov); Brazil (Rio Grande do Sul)	Hoffmann & Moran 1999
		<i>Rhyssomatus marginatus</i> Fähræus (Coleoptera: Curculionidae)	Seed feeder	Released 1984, established	Extensive	Argentina (Buenos Aires Prov)	Hoffmann & Moran 1999
		<i>Trichapion lativentre</i> (Béguin-Billecocq) (Coleoptera: Brentidae: Apioninae)	Flower-bud feeder	Released 1970s, established, present before release	Extensive	Argentina (Buenos Aires Prov)	Hoffmann & Moran 1999
HALORAGACEAE							
<i>Myriophyllum aquaticum</i> (Vell.) Verdc. parrot's feather South America	Complete	<i>Lysathia</i> sp. (Coleoptera: Chrysomelidae: Galerucinae)	Leaf feeder	Released 1994, established	Extensive	Brazil	Cilliers 1999; Coetzee et al. 2011b
		<i>Xanthomonas campestris</i> (Pammel) Dawson (?) (Proteobacteria: Xanthomonadales: Xanthomonadaceae)	Bacterial wilt	Not released, occurs locally; rejected	Considerable, localised, not persistent		Morris et al. 1999
HYDROCHARITACEAE							
<i>Hydrilla verticillata</i> (L.f.) Royle hydrilla Old World	Substantial	<i>Hydrellia purcelli</i> Deeming (Diptera: Ephydriidae)	Leaf miner	Release permit issued, shelved		Singapore	Coetzee et al. 2011a; Bownes 2014, 2015; Bownes & Deeming 2016
		<i>Parapoynx diminutalis</i> Snellen (Lepidoptera: Crambidae)	Leaf cutter	Not released, occurs locally	Extensive	Asia	Bownes, 2010, 2018
MYRTACEAE							
<i>Leptospermum laevigatum</i> (Gaertn.) F.Muell. Australian myrtle Australia	Negligible	<i>Aristaea thalassias</i> (Meyrick) [formerly in <i>Parectopa</i>] (Lepidoptera: Gracillariidae)	Leaf feeder	Released 1996, established	Trivial	Australia	Gordon 1999b, Gordon 2011
		<i>Dasineura strobila</i> Dorchin (Diptera: Cecidomyiidae)	Bud galler	Released 1994, established, present before release	Trivial	Australia	Gordon 1999b; Dorchin & Adair 2011; Gordon 2011
POACEAE							
<i>Arundo donax</i> L. giant reed Mediterranean, Europe and Asia	Negligible	<i>Tetramesa romana</i> Walker (Hymenoptera: Eurytomidae) - South African biotype	Stem galler	Present without being released	Trivial		Marshall et al. 2018
PONTEDERIACEAE							
<i>Eichhornia crassipes</i> (C.Mart.) Solms water hyacinth South America	Substantial	<i>Acremonium zonatum</i> (Sawada) W.Gams (anamorphic fungus; Hypocreales)	Leaf pathogen	Not released, occurs locally	Trivial but can be considerable in presence of insect agents		Morris et al. 1999
		<i>Alternaria eichhorniae</i> Nag-Raj & Ponnappa (anamorphic fungus; Pleosporales: Pleosporaceae)	Leaf pathogen	Not released, occurs locally; shelved	Trivial but can be considerable in presence of insect agents		Morris et al. 1999
		<i>Cercospora piaropi</i> Tharp. (anamorphic fungus; Mycosphaerellales: Mycosphaerellaceae)	Leaf pathogen	Not released, occurs locally	Unknown, cannot be distinguished from <i>C. rodmanii</i> in the field		Morris et al. 1999

<i>Cercospora rodmanii</i> Conway (anamorphic fungus; Mycosphaerellales: Mycosphaerellaceae)	Leaf pathogen	Released 1992, established	Considerable	USA	Hill & Cilliers 1999; Morris et al. 1999
<i>Cornops aquaticum</i> (Brüner) (Orthoptera: Acrididae: Leptysminae)	Leaf feeder	Released 2011, establishment unconfirmed		Amazonas, Brazil	Hill & Cilliers 1999; Bownes 2009, Bownes et al. 2010a,b; Coetzee et al. 2011b; Bownes et al. 2013a,b
<i>Eccritotarsus catarinensis</i> (Carvalho) (Hemiptera: Miridae)	Leaf sucker	Released 1996, established	Considerable	Santa Catarina, Brazil; and Loreto, Peru	Hill & Cilliers 1999; Coetzee et al. 2005, 2007, 2011b
<i>Eccritotarsus eichhorniae</i> Henry (Hemiptera: Miridae)	Leaf sucker	Released 2007, established	Considerable	Loreto, Peru	Paterson et al. 2016; Henry 2017
<i>Megamelus scutellaris</i> Berg (Hemiptera: Delphacidae)	Leaf sucker	Released 2013, established	Unknown	Argentina via USA	Coetzee et al. 2011b
<i>Neochetina bruchi</i> Hustache (Coleoptera: Curculionidae)	Stem borer	Released 1990 & 1996, established	Considerable	Argentina via Zimbabwe	Hill & Cilliers 1999; Coetzee et al. 2011b
<i>Neochetina eichhorniae</i> Warner (Coleoptera: Curculionidae)	Stem borer	Released 1974 & 1985, established	Considerable	Argentina	Hill & Cilliers 1999; Coetzee et al. 2011b
<i>Niphograptus albiguttalis</i> Warren (Lepidoptera: Crambidae)	Petiole borer	Released 1990, established	Considerable	Argentina via USA	Hill & Cilliers 1999; Coetzee et al. 2011b
<i>Orthogalumna terebrantis</i> Wallwork (Acari: Sarcoptiformes: Galumnidae)	Leaf miner	Released 1989, established	Considerable	Argentina	Hill & Cilliers 1999; Coetzee et al. 2011b

PROTEACEAE

<i>Hakea gibbosa</i> (Sm.) Cav. rock hakea Australia	Negligible	<i>Aphanasium australe</i> (Boisduval) (Coleoptera: Cerambycidae)	Stem borer	Alternative host, released 2001, established	Unknown	Australia (NSW)	Gordon 1999a, 2003; Gordon & Fourie 2011
		<i>Erytenna consputa</i> Pascoe (Coleoptera: Curculionidae)	Green-fruit feeder	Alternative host, released 1975, established	Trivial	Australia (SA)	Gordon 1999a; Gordon & Fourie 2011
<i>Hakea sericea</i> Schrad. & J.C.Wendl. silky hakea Australia	Substantial	<i>Aphanasium australe</i> (Boisduval) (Coleoptera: Cerambycidae)	Stem borer	Released 2001, established	Unknown	Australia (NSW)	Gordon 1999a, 2003; Gordon & Fourie 2011
		<i>Carposina autologa</i> Meyrick (Lepidoptera: Carposinidae)	Seed feeder	Released 1970 & 1982, established	Trivial	Australia (South East & South West)	Gordon 1999a; Gordon & Fourie 2011
		<i>Colletotrichum acutatum</i> J.H. Simmonds (Glomerellales: Glomerellaceae)	Stem gummosis disease	Not released, occurs locally; developed as mycoherbicide "Hakatak"	Extensive	South Africa	Morris 1991; Morris et al. 1999; Lubbe et al. 2004; Gordon & Fourie 2011
		<i>Cydmaea binotata</i> Lea (Coleoptera: Curculionidae)	Leaf & shoot borer	Released 1979, established	Trivial	Australia	Gordon 1999a; Gordon & Fourie 2011
		<i>Dicomada rufa</i> Blackburn (Coleoptera: Curculionidae)	Flower-bud feeder	Released 2006, established	Unknown	Australia	Gordon 1999a; Gordon & Fourie 2011

		<i>Erytenna consputa</i> Pascoe (Coleoptera: Curculionidae)	Green-seed feeder	Released 1970 & 1974, established	Extensive	Australia (SA)	Gordon 1999a; Gordon & Fourie 2011
SALVINIACEAE							
<i>Salvinia molesta</i> D.S.Mitch. water fern South America	Complete	<i>Cyrtobagous salviniae</i> Calder & Sands (Coleoptera: Curculionidae)	Stem borer	Released 1985, established	Extensive	Brazil via Australia via Namibia	Cilliers et al. 2003; Coetzee et al. 2011b
SAPINDACEAE							
<i>Cardiospermum grandiflorum</i> Sw. balloon vine South America	Under evaluation	<i>Cissoanthonomus tuberculipennis</i> Hustache (Coleoptera: Curculionidae)	Seed feeder	Released 2013, established	Extensive	Argentina	Mc Kay et al. 2010; Simelane et al. 2011a
SOLANACEAE							
<i>Solanum elaeagnifolium</i> Cav silverleaf nightshade, satansbos North, Central and South America	Substantial	<i>Frumenta nephelomicta</i> (Meyrick) (Lepidoptera: Gelechiidae)	Fruit galler	Released 1979 & 1985, not established		Mexico	Olckers et al. 1999
		<i>Frumenta</i> sp. (Lepidoptera: Gelechiidae)	Stem & fruit galler	Released 1989, not established		Texas, USA	Olckers 1995; Adamski & Brown 2002
		<i>Leptinotarsa defecta</i> (Stål) (Coleoptera: Chrysomelidae: Chrysomelinae)	Leaf feeder	Released 1992, established	Moderate	Texas, USA	Olckers & Hulley 1994; Olckers et al. 1995; Hoffmann et al. 1998
		<i>Leptinotarsa texana</i> (Schaeffer) (Coleoptera: Chrysomelidae: Chrysomelinae)	Leaf feeder	Released 1992, established	Extensive	Texas, USA	Olckers & Hulley 1994; Olckers et al. 1995; Hoffmann et al. 1998
<i>Solanum mauritianum</i> Scop. bugweed South America	Negligible	<i>Anthonomus santacruzii</i> Hustache (Coleoptera: Curculionidae)	Flower-bud feeder	Released 2008, established	Trivial	Argentina	Olckers 2003, 2008, 2011b; Cowie et al. 2016a, 2017; Singh & Olckers 2017; Cowie et al. 2018; English & Olckers 2018
		<i>Gargaphia decoris</i> Drake (Hemiptera: Tingidae)	Leaf sucker	Released 1999, established	Trivial, occasional outbreaks	Argentina, Brazil	Olckers 2000a, 2011b; Olckers & Lotter 2004; Olckers & Borea 2009; Cowie et al. 2016b, 2018
<i>Solanum sisymbriifolium</i> Lam. wild tomato, dense-thorned bitter apple South America	Substantial	<i>Gratiana spadicea</i> (Klug) (Coleoptera: Chrysomelidae: Cassidinae)	Leaf feeder	Released 1994, established	Extensive	Argentina, southern Paraguay and Brazil	Hill & Hulley 1995; Byrne et al. 2002; King et al. 2011a
VERBENACEAE							
<i>Lantana camara</i> L. (<i>sensu lato</i>) lantana Central and South America	Negligible (Highveld) to substantial (coastal & Lowveld)	<i>Aceria lantanae</i> (Cook) (Acari: Trombidiformes: Eriophyidae)	Flower galler	Released 2007, established	Extensive, on certain varieties in some areas	Florida, USA; Cuba	Urban et al. 2001, 2011a; Mukwevho et al. 2017
		<i>Alagoasa parana</i> Samuelson (Coleoptera: Chrysomelidae: Galerucinae)	Leaf feeder	Released 1985, not established		Brazil via Australia	Cilliers & Neser 1991
		<i>Autoplusia illustrata</i> (Guenée) (Lepidoptera: Noctuidae)	Leaf feeder	Released 1978 & 1984, not established		Colombia via Australia	Cilliers & Neser 1991

<i>Calycomyza lantanae</i> (Frick) (Diptera: Agromyzidae)	Leaf miner	Released 1982, established	Moderate	Trinidad via Australia; Later also Florida, USA	Baars & Nesar 1999
<i>Coelocephalapion camarae</i> Kissinger (Coleoptera: Brentidae: Apioninae)	Petiole galler	Released 2007, established	Moderate but localized	Mexico	Baars et al. 2006
<i>Crociosema lantana</i> Busck [formerly in <i>Epinotia</i>] (Lepidoptera: Tortricidae)	Flower & receptacle miner	Present before release; released 1984, established	Trivial	Mexico via Hawaii, USA	Baars 2003
<i>Eutreta xanthochaeta</i> Aldrich (Diptera: Tephritidae)	Shoot galler	Released 1983, not established; rejected		Hawaii, USA	Mabuda 2005
<i>Falconia intermedia</i> (Distant) (Hemiptera: Miridae)	Leaf sucker	Released 1999, established	Moderate, localized	Jamaica	Baars et al. 2003
<i>Hypena laceratalis</i> Walker (Lepidoptera: Noctuidae)	Leaf feeder	Not released, native	Moderate	Native	Baars 2003
<i>Lantanophaga pusillidactyla</i> (Walker) (Lepidoptera: Pterophoridae)	Flower miner	Present before release; released 1984, not established	Trivial	Mexico via Hawaii, USA	Baars 2003
<i>Leptobyrsa decora</i> Drake (Hemiptera: Tingidae)	Leaf sucker	Released 1972-1984, not established		Colombia, Peru via Australia	Cilliers & Nesar 1991
<i>Longitarsus bethae</i> Savini & Escalona (Coleoptera: Chrysomelidae: Galerucinae)	Root feeder	Released 2007, established	Moderate, localised	Mexico	Simelane 2005, 2010
<i>Neogalia sunia</i> (Guenée) (Lepidoptera: Noctuidae)	Leaf feeder	Released 1962 & 1969, not established		California, USA via Hawaii via Australia	Cilliers & Nesar 1991
<i>Octotoma championi</i> Baly (Coleoptera: Chrysomelidae: Cassidinae)	Leaf miner	Released 1978, 1995, not established		Costa Rica via Australia	Cilliers & Nesar 1991
<i>Octotoma scabripennis</i> Guérin-Mèneville (Coleoptera: Chrysomelidae: Cassidinae)	Leaf miner	Released 1971-1975, established	Considerable	Mexico, via Hawaii, via Australia	Cilliers 1987
<i>Ophiomyia camarae</i> Spencer (Diptera: Agromyzidae)	Leaf miner	Released 2001, established	Considerable	Florida, USA	Simelane 2002; Simelane & Phenyne 2005
<i>Ophiomyia lantanae</i> (Froggatt) (Diptera: Agromyzidae)	Fruit miner	Present before release; released 1961	Moderate	Mexico via Hawaii, USA	Cilliers 1987
<i>Orthonama ignifera</i> (Warren) [formerly in <i>Leptostales</i>] (Lepidoptera: Geometridae)	Leaf feeder	Release permit issued		Florida, USA; Mexico	Williams & Madire 2008
<i>Passalora lantanae</i> (Chupp) U.Braun & Crous var. <i>lantanae</i> [formerly in <i>Mycovellosiella</i>] (anamorphic fungus; Mycosphaerellales: Mycosphaerellaceae)	Leaf pathogen	Released 2002, not established		Florida, USA	Den Breeÿen 2003; Den Breeÿen & Morris 2003; Retief 2010a

	<i>Plagiohammus spinipennis</i> (Thomson) (Coleoptera: Cerambycidae)	Stem borer	Released 1973, not established		Mexico via Hawaii, USA via Australia	Cilliers & Nesar 1991
	<i>Puccinia lantanae</i> Farl. (Pucciniales: Pucciniaceae)	Leaf and stem rust pathogen	Release permit issued; imported		Peru	Renteria et al. 2004
	<i>Salbia haemorrhoidalis</i> (Guenée) (Lepidoptera: Crambidae)	Leaf feeder	Released 1962, established	Trivial	Cuba via Hawaii, USA	Baars 2003
	<i>Teleonemia elata</i> Drake (Hemiptera: Tingidae)	Leaf sucker	Released 1972, not established		Brazil via Australia	Cilliers & Nesar 1991
	<i>Teleonemia scrupulosa</i> Stål (Hemiptera: Tingidae)	Leaf & flower sucker	Released 1961, 1972, 1984, established	Considerable	Mexico via Hawaii (1961); C & S America via Australia (1972); via Mauritius (1984)	Baars & Nesar 1999
	<i>Uroplata fulvopustulata</i> Baly (Coleoptera: Chrysomelidae: Cassidinae)	Leaf miner	Released 1978, not established		Costa Rica via Australia	Day et al. 2003
	<i>Uroplata girardi</i> Pic (Coleoptera: Chrysomelidae: Cassidinae)	Leaf miner	Released 1974, 1983, established	Considerable, coastal	Brazil via Hawaii, USA via Australia (1974); Argentina via Australia (1983)	Baars & Nesar 1999
	<i>Uroplata lantanae</i> Buzzo & Winder (Coleoptera: Chrysomelidae: Cassidinae)	Leaf miner	Released 1984, not established		Brazil via Australia	Cilliers & Nesar 1991

For each of the agents that has established successfully, a rating is given for the perceived degree of damage that it inflicts on the target weed. These ratings (Anon. 1999), which have been widely adopted since 1999, and slightly amended in this account, are sometimes based on formal measurements and otherwise on subjective visual assessments, and include the following categories. **Extensive:** Very high levels of damage, as much as could be expected from the agent. Few plants survive, or growth is arrested, or almost no seeds are produced. **Considerable:** High levels of damage. Some plants may survive but growth rates are noticeably slower, or seed production is reduced by more than 50%. **Moderate:** Perceivable damage, but most plants survive. Growth may be slowed to some extent, or seed production is reduced by less than 50%. **Trivial:** Some damage, but survival, growth and seed production of the plants is almost normal. **Unknown:** Agent has been too recently released, or has not been evaluated.

For each weed species on which at least one biological control agent has established, the impact of the agent (where only one is established) or combined impact of all agents (where two are more are established) (i.e. the degree of control) (adapted from Anon. 1999) is rated by estimating the degree to which the impact or importance of the target weed species has been reduced by the agent(s). Assessments are based on the degree of reduction in the use of alternative control methods (chemical or mechanical) since the introduction of biological control agents, and include the following categories. **Complete:** No other control measures are needed to reduce the weed to acceptable levels, at least in areas where the agents are established. **Substantial:** Other methods are needed to reduce the weed to acceptable levels, but less effort is required (e.g. less frequent herbicide applications or less herbicide needed per unit area). **Negligible:** In spite of damage inflicted by the agents, control of the weed remains entirely reliant on the implementation of other control measures. **Not determined:** Either the release of the agents has been too recent for meaningful evaluation, or the programme has not been evaluated. **Under evaluation:** an active programme is underway to evaluate the impact of biological control agents on the weed, which is expected to result in categorisation as complete, substantial or negligible control.

Adapted from: Klein, H. 2011. A catalogue of the insects, mites and pathogens that have been used or rejected, or are under consideration, for the biological control of invasive alien plants in South Africa. In: Moran, V.C., Hoffmann, J.H. & Hill, M.P. (Eds) Biological Control of Invasive Alien Plants in South Africa (1999-2010). African Entomology (Special Issue) 19(2): 515-549.

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