Scientific name: ***Arion ater*** **Common name: European black slug**

Alaska invasion/introduction history

Arion ater was previously considered two species A. ater and A. rufus (Quick 1947, 1949). In Alaska, the taxonomic status of the European black slug (A. ater) is still under debate. European black slugs have been reported around Anchorage, Cordova, Yakutat, Gustavus, Juneau, Sitka, Tenakee Springs, Ketchikan, and Kodiak Island (see references in Gotthardt 2010), with the suspected mode of introduction being from nursery plants or potting soil (Wittwer 2004, Meyers 2006), or adhered to pallets or totes delivered to fish canneries from elsewhere.

Ranking Summary		
	Potential Max	Score
Distribution	30	13
Biological Characteristics	30	25
Ecological Impact	30	17
Feasibility of Control	10	7
Total	100	62
Invasiveness (out of 100) =	62 **Moderately invasive**	

Distribution	**Score**
Current global distribution (0-10)	6

The European black slug is native to western and central Europe and is invasive in southeastern Australia and North America (Featherstone 2006).

Extent of the species US range and/or occurrence of formal state or provincial listings (0-10)	3

In the United States, black slugs have been introduced into Alaska and the Pacific Northwest. Additionally, black slugs are found in Newfoundland and British Columbia (Featherstone 2006, Forsyth 2004).

Role of anthropogenic and natural disturbance in establishment (0-5)	2

In the Cordova area, black slugs are typically found near disturbed soils and close to human populations, but are occasionally found in less disturbed areas (Meyers and Harris 2005, Meyers 2006).

Climatic similarity between site of origin and release (0-5)	2

Native to western and central Europe (Forsyth 2004). Introduced slugs inhabit British Columbia, which is of similar climate to southeastern Alaska. Slugs are moderately tolerant of cold temperatures (Mellanby 1961), but severe winters may limit their distribution farther north (Wittwer 2004).

Total for distribution 13 /30

Biological Characteristics and Dispersal	**Score**
Invasive elsewhere (0-5)	5

European black slugs are invasive in southern British Columbia, the Pacific Northwest, and southeastern Australia (Featherstone 2006).

Dietary specialization (0-5)	5

Black slugs are omnivorous eating fungi, carrion, lichens, earthworms, leaves, stems, live and decomposing vegetation, and feces (Forsyth 1999).

Habitat specialization (0-5)	5

Slugs live in moist, cool soil in areas such as road cutbanks, fields, gardens, campgrounds, and other disturbed areas with patches of shade (Gotthardt 2010).

Average number of reproductive events per adult female per year (0-5)	5

Slugs can lay eggs multiple times a year, as seen by a similar Arion species (A. lusitanicus), which laid between 56-58 batches of eggs from mid June to the end of November in an Austrian study (Grimm 1996).

Potential to be spread by human activities (0-5)	5

Humans spread adult slugs and eggs in nursery plants (including balled-burlap shrubs), on canoes, boats trailers, pallets, fish totes, in ice chests, and in trail construction materials (Gotthardt 2010).

Innate potential for long distance dispersal (0-5)	0

Black slugs do not have any mechanisms for innate long distance dispersal.

Total for biological characteristics 25 / 30

Ecological Impact	**Score**
Impact on population dynamics of other species (0-10)	7

Slugs can restrict seedling recruitment in favored species (Hanley et al. 1996). When slugs are abundant, favored food items can become rare or extirpated in an area, but Meyer (2006) did not notice heavy herbivory of any one species around Cordova. Seeds and spores can be dispersed by slugs. The impact of black slugs on native slugs in Alaska is unknown, but in Vancouver,

British Columbia, the native banana slug was displaced by non-native slugs (Busch 2007).

Impact on natural community composition (0-10) 3

Slugs have the potential to alter community composition and plant diversity by restricting seedling recruitment in early stage communities and by reducing dominant plants in later successional stage forests (Buschmann et al. 2005). In 2006, a slug survey by Meyer did not report any ecological damage caused by the black slugs around the Cordova area (Meyer 2006).

Impact on natural ecosystem processes (0-10) 7

Slugs process decaying plant and fecal material, helping to recycle organic matter and nutrients back into a form that can be used by other organisms. Additionally, this process aids in the maintenance of soil fertility. The mucus from slug activity is also known to accelerate nutrient cycling (e.g. C, N and P) (Theenhaus and Scheu 1996). Also, black slugs have the potential to impact the dynamics of plant succession in both early and later stage communities by feeding extensively on plant material of both seedlings and mature plants (Buschmann et al. 2005).

Total for ecological impact 17 /30

Feasibility of control	Score
Number of populations in Alaska (0-3)	2

European black slugs have been reported around Anchorage, Cordova, Yakutat, Gustavus, Juneau, Sitka, Tenakee Springs, Ketchikan, and Kodiak Island (see references in Gotthardt 2010).

Significance of the natural area(s) and native species threatened (0-3) 2

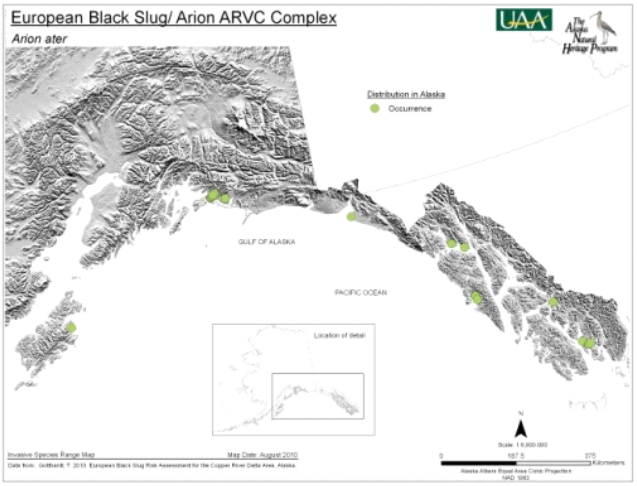
In some places, black slugs have been reported damaging lilies and orchids. In British Columbia, they have impacted plant species at risk, including deltoid balsamroot (Balsamorhiza deltoidea) and yellow montane violet (Viola praemorsa) (Gary Oak Ecosystem Recovery Team 2003).

General management difficulty (0-4) 3

Absolute eradication is unlikely. The most effective management option includes a combination of prevention of spread, early detection and rapid response, and control. To prevent slugs from spreading, public education can raise awareness to reduce human mediated spread of slugs. Early detection and rapid response would most likely involve a watch program allowing biologists and the public to report sightings and control would involve physically removing slugs or possibly chemical treatments (Gotthardt 2010).

Total for feasibility of control 7 / 10

Range Map



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