BIRDS AND INVASIVE PLANTS:
A review of interactions & management considerations

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PERENNIAL PEPPERWEED (*Lepidium latifolium*)

ECOLOGICAL CHARACTERISTICS

- Perennial, native to Eurasia
- Grows up to 2 m. tall
- Changes invertebrate community, particularly detritivores, thus altering organic matter volume and characteristics (Whitcraft unpubl data)
- Invades throughout California in a range of habitats including agricultural areas, riparian corridors, and marshes.

BIRD STUDIES : SF Bay Tidal marsh

Sarah Estrella 2008: CDFG & Sacramento State Univ. (unpubl. data):

- Lepidium displaces native plants favored by rails e.g. bulrush, *Schoenoplectus* (*Scirpus*) species
- Rails never found in areas dominated by Lepidium

Spautz et al 2004: PRBO

- Lepidium used for nesting by songbirds when present
- Positive association with
  - Common yellowthroat presence (also Herzog et al 2005)
  - Song sparrow territory density at Suisun study site
- Effect on song sparrow abundance varies by bay: positive SF Bay & Suisun Bay; negative San Pablo Bay
- No effect on song sparrow nesting success
- No effect on California black rail abundance




Tidal marsh at Benicia State Park, Solano County

GIANT REED (*Arundo donax*)

ECOLOGICAL CHARACTERISTICS

- Tall (10m), fast-growing grass native to Eurasia
- Invades riparian areas throughout California, especially southern California; invading N. California Delta
- Increases fire danger and reduces water flow
- Lack of shade reduces habitat value for salmonids


James Gallagher, Sea and Sage Audubon

BIRD STUDY

Santa Ana Watershed Assoc. (Pike et al. unpubl):

After Arundo removal from Santa Ana River (So. Cal.), the number of endangered least Bell's vireos pairs increased from 19 to 286 over 20 yrs, and continue to increase

- 76% of vireos nested in native plants


David Chang, Santa Barbara Co. Ag. Commissioner's Office

Kisner (2004):

- Number of nonlisted avian species declined by 32-41% as arundo cover increased from 0 to 50%.
- Even a small coverage of arundo had impact.

INTRODUCTION

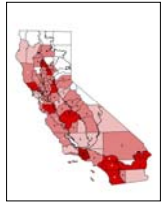
There is a general consensus that invasive plants are bad for natural systems – but are they all equally bad? Many species of invasive plants pose a severe threat to ecosystems by displacing native plants and altering ecosystem structure and function (Table 1). However, there are surprisingly few studies of interactions between invasive plants and wildlife, positive or negative (Cal-IPC & TWS 2007), despite the fact that in some areas invasive plants have mostly displaced native species We reviewed published and unpublished reports describing quantitative studies of the impacts of invasive plants on birds in California. Our objective was to determine if any generalizations can be drawn from the available data.

A better understanding of the full scale of direct and indirect interactions may help inform management decisions that take into consideration the full species community within a particular location or habitat. More than 200 species of invasive plants are established in California (Cal-IPC 2006). Where birds use invasive plants, control methods for those plants are designed to reduce impacts on the birds, with removal outside of the breeding season or rapid replanting of native plants. Controversies can arise when removal of invasive plants appears to conflict with avian species' needs, especially when the birds are threatened or endangered. However, some invasive plants may be "ecological traps" that attract birds but ultimately lead to a decrease in their survival or reproduction. Understanding these interactions may become increasingly important as birds and plants shift their ranges due to climate change.

We used case studies to examine the following questions:

- How do birds use invasive plants?
- Do invasive plants alter avian habitat selection or other activities?
- Are invasive plants "ecological traps" for bird communities?


Lepidium distribution


Arundo distribution

CONCLUSIONS & RECOMMENDATIONS

Interactions have been quantified for only a few species of birds and invasive plants. Most of these studies have been correlative, addressing bird abundance in association with invasive species cover; others are descriptive studies of birds returning to nest after invasives are removed. Few, if any, studies addressed the ecological mechanisms of these associations or were based on testing specific hypotheses using scientific methods.

We found no data on the threshold of invasive plants that create negative impacts; most studies focus on areas of monocultures.

While invasive plants may create habitat structure, they do not necessarily provide a good habitat for nesting or foraging. However, these hypotheses remain to be tested.

Management may be complicated by conflicting responses of different species or guilds of birds (or other wildlife) to invasive plants.

Dense stands of some invasive plants, such as *Spartina alterniflora* hybrids (results not summarized here) do appear to be ecological traps.

Revegetation with native species after removal of invasive plants can allow local bird populations to recover. Revegetation should be an integral component of invasive plant removal efforts.

Table 1. Potential changes in ecological processes induced by invasive plants – and how these changes may affect bird populations

Path	Ecological process	Potential effects on birds
Direct	Changes in physical vegetation structure: • density, height, phenology • nesting substrate & cover • foraging substrate & cover • insulation from weather	Changes in: • availability of nesting & foraging substrate • predation rates • food availability • insulation from weather • habitat selection dynamics.
Direct & Indirect	Changes in food web dynamics & components: • primary producers (i.e. displacement of native plants) • herbivores • detritivores • remainder of food web	Changes in: • food availability • habitat selection dynamics
Indirect	Physical processes: • hydrology • erosion/sedimentation, • fire & other disturbance processes • soil chemistry • nutrient cycling	Changes in: • availability of nesting & foraging substrate • predation rates • food availability • insulation from weather • habitat selection dynamics

CAPE IVY (*Delairea odorata*)

ECOLOGICAL CHARACTERISTICS

- Vine, native to South Africa
- Mostly invades shady riparian areas
- Smothers other vegetation
- Inedible to most wildlife species
- May be toxic to aquatic organisms
- Reproduces & spreads easily from fragments – does not produce seed

BIRD STUDIES

Gardali et al 2001 – Marin County

- Very little use for nesting by riparian birds
- After Cape Ivy removal at Redwood Creek in Marin County:
  - → Increased number of bird species
  - → Increased species diversity
  - → Increased overall species abundance
  - → Nesting birds moved in: Swainson's thrush, Wilson's warbler, song sparrow


Credit: Bromeliad

FRENCH & SCOTCH BROOMS (*Genista monspessulana, Cytisus scoparius*)


Credit: Pacific Horticulture

ECOLOGICAL CHARACTERISTICS

- Shrubs, native to Europe
- Dense stands outcompete other plants
- Increased fire danger
- Seeds and foliage unpalatable to wildlife
- Seeds can survive 20+ years in soil


Photo credit: Calibas, Wiki Commons

BIRD STUDIES

Stralberg & Gardali 2007:

Bird distribution models for Golden Gate Nat'l. Rec. Area & Pt. Reyes showed that areas classified as broom dominant had

- fewer scrub-nesting focal species
- fewer Bewick's wrens & common yellowthroats

Birds rarely use broom for nesting:

Marin Municipal Water District (Marin Co.) has found only one nest in broom during many years of intensive control efforts (J. Klein, pers. obs.)

Nests rarely found in broom (T. Gardali, pers. obs.)

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