Gullet content analysis of ducks shot in Willapa Bay WA during fall and winter 2009 and 2010.

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Introduction

The expansion of *Z. japonica* in Willapa Bay has caused concern in the commercial shellfish industry. Infestations of *Z. japonica* can cause major reductions in hard shell production (Fisher & Patten 2011). The recent listing of *Z. japonica* as a Class C noxious weed in Washington has alarmed waterfowl hunters who fear that significant loss in foraging habitat could occur if *Z. japonica* control commences. To address these concerns, a study was conducted in 2009 and 2010 to try to quantify the level of waterfowl foraging on *Z. japonica* in Willapa Bay.

Methodology

During the hunting season of 2009 and 2010 esophagus and proventriculus contents of 118 duck samples were collected from hunters in Oysterville, Nahcotta, Porter Point Willapa National Wildlife Unit, and Nemah Flats. A total of 18 mallard (*Anas platyrhynchos)*, 66 pintails (*A. acuta)*, 14 teal (*A. carolinensis)* and 20 wigeon (*A. americana)* were collected. The gizzards were separated from proventriculi prior to examination. The upper gastrointestinal tract was dissected lengthwise from the proximal proventriculus sphincter to the distal end of the esophagus. GI tissue was opened and laid out flat to expose contents of the tract. A dissecting microscope was used as an aid to separate contents from tissue, and to separate samples of animal, mineral and vegetable volumes. Separated contents were air dried and weighted. When possible (if distinguishable) the number of *Z. japonica* leaf blades was counted in each bird.

Results

A total of 118 ducks across 4 species were sampled (Table 1). Pintail foraged the least on *Z. japonica* (15%) and Wigeon (85%) the most. Pintail and Teal had only trace amounts of *Z. japonica* in their stomachs. Mallard had the highest level of foraging on *Z. japonica* seeds of the 4 species. None of the mallards obtained on the refuge contained *Z. japonica*. Many (~ 1/3rd) of the duck samples had empty esophagi and proventriculi. Overall, the total dry amount of *Z. japonica* contained within Mallards, Pintails and Teals was fairly insignificant (<0.1 g/bird), while for Wigeon it was 0.17 g/bird.

Discussion

These results confirm previous studies on the foraging habits of waterfowl (Baldwin and Lovvorn, 1994, 1995, 1996.) that indicate that Wigeon have the highest consumption of *Z. japonica* of the common duck species. They suggest *Z. japonica* could be an important food in

their diet in Boundary Bay, B.C. Our results for Willapa Bay, based on dry weight analysis of stomach vegetation and the small percentage of birds with > 4 *Z. japonica* leaves, suggests that foraging value of Z. *japonica* across all species of duck in Willapa Bay is not as critical as suggested by Baldwin and Lovvorn. In addition, the amount of *Z. japonica* available for forage rapidly declines (75% decrease in dry weight between 10/8 and 11/15) at the onset of fall migration (Figure 1). Because of its extensive spread throughout the bay (>20,000 ac) ample *Z. japonica* will be available for waterfowl foraging , even when control of *Z. japonica* occurs on the commercial shellfish grounds where it is a significant production pest (~2,000 to 3,000 ac). A more detailed foraging budget would be required to make additional inferences.

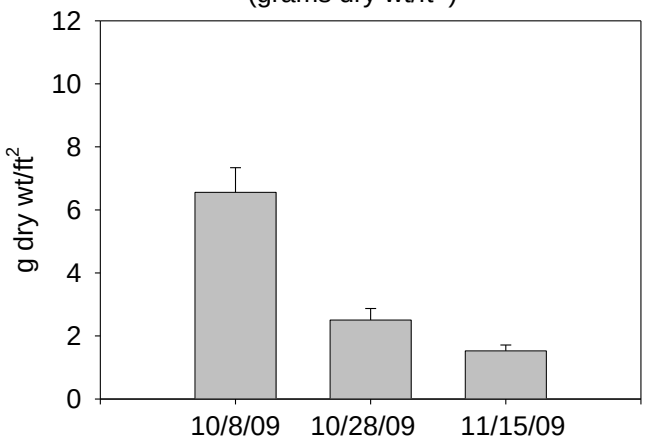
Table 1. Assessment of esophagus and proventriculus contents of duck samples collected during the fall/winter hunting season in 2009 and 2010.

				Esophagus + proventriculus content									
	# bird dis-sected	year		% with vege-tation	% with *Z. jap-onica*	% with *Z. japonica* leaves			% with *Z. jap-onica* seeds	% empty	dry wt of vegetation (g)/ bird *		
Species		09	10			> 1 lf.	> 2 lvs.	> 4 lvs.			N	mean	std. err.
Mallard	18	15	3	72	44	22	17	0	22	39	3	0.051	0.034
Pintail	66	33	33	71	15	6	2	0	8	38	23	0.091	0.043
Teal	14	13	1	93	43	0	0	0	14	7			
Wigeon	20	10	10	100	85	80	20	5	15	0	9	0.175	0.042
total	118	71	47	79	35	20	8	1	12	28			

*vegetation dry only collected in 2010. Mean is only from birds containing vegetation in their esophagus + proventriculus.

There was no trend for a difference in contents between different locations, other than Mallards shot on the wildlife refuge had no *Z. japonica*.

Figure 1. Decline in *Z. japonica* density during the fall (grams dry wt/ft^2)



Samples collected Leadbetter, Oysterville and Nahcotta in 2009
n= 20, 19 and 32 for 10/8, 10/28 and 11/15 respectively.

References:

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