DECEMBER LEAF OUT OF FRANGULA ALNUS (RHAMNACEAE) IN EASTERN MASSACHUSETTS

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Frangula alnus Mill. (glossy buckthorn; hereafter “buckthorn”) is an invasive shrub that has become widespread across the northeastern US and southeastern Canada over the last century. Buckthorn is native to Europe, and genetic analyses suggest that populations in the northeastern US likely originated in western Europe (De Kort et al. 2016). Buckthorn rapidly forms dense thickets, reducing light availability and thus inhibiting regeneration of native species (e.g., Fagan and Peart 2004; Frappier et al. 2003a). Given the potential impact of buckthorn on forest composition and stand dynamics, a number of studies have examined its ecology and management (e.g., Burnham and Lee 2010; Catling and Porebski 1994; Converse 1984; Cunard and Lee 2009; Frappier et al. 2003b, 2004; Hamelin et al. 2015, 2017; Koning and Singleton 2013; Lee and Thompson 2012; McDonald et al. 2008).

In early December of 2015 I observed buckthorn plants leafing out over a span of several weeks in eastern Massachusetts. A strong El Niño contributed to record-breaking warmth across much of the northeastern US (NOAA 2016), with Boston experiencing many days in December with daily high temperatures 5-10°C warmer than normal (Figure 1). That observation prompted this opportunistic study in which I paired continued field observations with a laboratory experiment. The objectives of the study were to investigate why leaf out occurred at this time and to evaluate whether leafing out in December had lasting consequences for buckthorn. The findings provide new insights and raise new questions about (1) the causes and costs of off-season leaf out, (2) the ecology of buckthorn, and (3) the dynamics of nonnative species and climatic variability.

The study site is located in the northwestern part of the Middlesex Fells Reservation (hereafter “the Fells”) in the town of Winchester, ~10 km northwest of Boston. The buckthorns observed in this study...