



Drifting branches of *Crambe maritima* L. with fruits

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Abstract: The observation of dried branches of *Crambe maritima* L. in drift along the shore, with fruits still attached, indicates dispersal by the sea of this coastal plant is not restricted to single drifting fruits, but also occurs as drifting branches with the fruits still attached. Along the shore such branches are transported further by the wind as “tumble-weeds”, losing their fruits during tumbling.

Resumé : Rameaux dérivants de *Crambe maritima* L. portant des fruits. L'observation de rameaux portant des fruits de *Crambe maritima* sur le rivage de l'île de Texel (Pays-Bas) indique que la dispersion de cette plante côtière ne se fait pas seulement par la flottaison de ses fruits mais également par la dérive de rameaux portant les fruits. Ces rameaux sont alors transportés par le vent (“tumble-weeds”) sur le rivage et perdent leurs fruits.

Keywords: Drifting seeds, Tumble weeds, Dispersal, *Crambe maritima*, Texel, Wadden Sea.

Introduction

Dispersal of seeds is important for the range extension of a plant e.g. in relation to climate change. Moreover, it promotes gene flow within the distribution range of the population (van der Pijl, 1982). Plants have developed many ways for seed dispersal amongst which dispersal by water is well known for many plant species growing in wetland areas and along coasts.

Sea-kale *Crambe maritima* L. is a perennial coastal plant with 3 disjunct distribution areas in Europe: along the

Black Sea, along the Baltic Sea, and along the coasts of the UK and North-western France to the Netherlands (Weeda et al., 1987). It produces globose floating fruits of ~ 8 mm in diameter. The pericarp has a spongy structure and the seed does not completely fill the space in the pericarp (Ridley, 1930). This enables the fruit to float. Floating times recorded in the literature differ: 13 days (Sernander, 1901: p. 165), 1–4 weeks (Guppy, 1906), 4 weeks as a maximum (Straka, 1959), and > 45 days, but not viable anymore (Martins, 1857). In my own still ongoing experiments 50% of the 60 fruits I started with 6 months ago are still floating mid May 2005. Fruits have been recorded regularly from the coast of Texel (Cadée, 1992 & 2004).

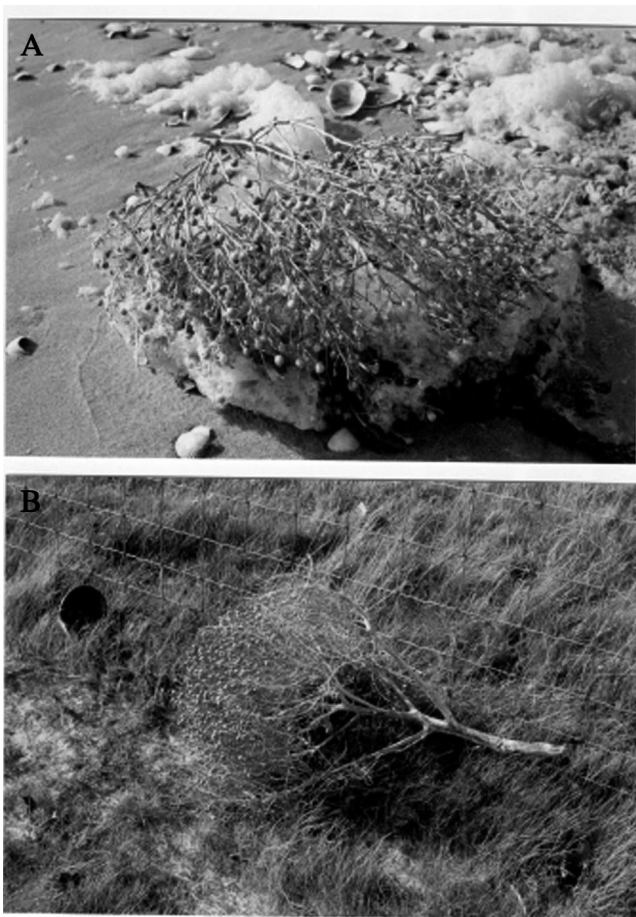


Figure 1. *Crambe maritima* L. branches with ripe fruits. **A.** In drift, recently arrived on the coast. **B.** After wind transport trapped in the fence on top of the dike.

Figure 1. *Crambe maritima* L. Rameaux portent des fruits. **A.** En dérive, venant d'arriver à la côte. **B.** Bloqué par une clôture au sommet d'une digue après avoir été transporté par le vent.

Observations

In October 2004, dried branches were observed, without roots and leaves, of *Crambe maritima* in drift on the coast and blown on the dike along the Dutch Wadden Sea on the southern part of the Island of Texel (Fig. 1). They were still loaded with their fruits, up to several hundreds per branch. The first was discovered on the 16th October, caught by the fence on top of the dike (Fig. 1B). Three days later five more were discovered again caught against the fence on top of the dike. A sixth had apparently just arrived in the drift at the foot of the dike and not yet travelled with the wind to the top of the dike (Fig. 1A). One was recognized one week later about 500 m from the place where it was first observed. It had lost most of its fruits, but some 50 of the > 500 were still adhering. Two others were again seen three weeks

later, about 1 km from the place where they were observed earlier. These had now lost all their fruits.

As large, fruit-producing plants of *Crambe maritima* do not occur on the southern part of the Island of Texel. Only small non-flowering plants I have seen up to now, and one flowering plant was photographed three years ago on the northern part of the island. The branches must have been transported drifting from elsewhere. Since 1959 *C. maritima* has got a permanent foothold in the southern part of the Netherlands (Walcheren, province Zeeland) (Visser, 1968; Weeda et al., 1987). From there it has rapidly spread northward reaching Texel in 1968 (Mennema, 1973). There are now several places in the vicinity of Texel, where rich flowering plants grow, such as Den Helder on the mainland opposite Texel (de Jonge, 1973; Cadée, 2004, distance 7 km) and along the Afsluitdijk (the closure dam between Dutch Wadden Sea and Lake IJssel), e.g. near Breezanddijk, (Piet de Wolf, pers. com., 2004; distance 25 km). It now also extended its range - making use of the residual northward coastal current along our coast - to other "upstream" Frisian Islands: Vlieland (in 1984), Schiermonnikoog (in 1995) (information based on data published in Gorteria, Wilma Eelman pers. comm. 2005), and Terschelling (observed on 5 localities by Ruud van der Meijden in 2005, pers. comm.). This northward range extension will finally link the North Sea *C. maritima* population with that of the Baltic as mentioned already by Mennema (1973).

The branches have arrived on Texel drifting. Although dispersal as a tumble-weed was also mentioned by Straka (1959), he thought this dispersal mechanism to be functioning on beaches in the vicinity of the plant. My observations on Texel show that entire branches may be dispersed first floating in seawater and subsequently, after arriving on the coast, by the wind as a tumble-weed, the distance travelled checked by man-made obstructions, and losing their fruits during tumbling. This dispersal mechanism may explain the appearance of *C. maritima* inland, behind the first line of dunes in Renesse (prov. Zeeland, Visser, 1968) and on Texel about 10 years ago (Wilma Eelman, pers. comm., 2005). This might also enlarge the time they can drift in sea and therefore their distribution. The related *Cakile maritima* is also reported to be dispersed by floating fruits and as a tumble-weed on beaches (e.g. Bouman et al., 2000). However, up to now I have only observed *Cakile maritima* fruits in drift, no branches with fruits.

Although thousands of *Crambe maritima* fruits have arrived on Texel's southern coast in October 2004, it is not very probable that this will lead to a new population of flowering plants along the Wadden Sea dike, as this part of the dike is regularly mowed. Some may germinate, as does *Cakile maritima* on the same dike. However, *Cakile maritima* is an annual; *Crambe maritima* is a perennial plant and does not flower in its first year.

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