

Fatty Acid, Phospholipid and Sterol Composition of Salt Cedar (*Tamarix spp.*) Roots

Abstract

The salt cedar, *Tamarix spp.*, is found mostly in the southwestern U.S., originally coming from Eurasia. A lot of beneficial properties are not widely known. As one example, *Tamarix* absorbs a large amount of boron without being damaged. *Tamarix* can help clear up boron contamination, that was created by burning fossil fuels, running power plants and landfills. *Tamarix* could be used to keep boron localized; preventing it from going into the ground water. *Tamarix* can live up to 100 years.

Our initial hypothesis was, that boron resistance may depend on altered root membranes. *Tamarix* proved to be resistant to boron up to 200 mg/L (ppm) in hydroponic growth experiments with the duration of up to three months. The aim of this study was to explore routes of boron transport in *Tamarix*. First, we looked at root lipids including fatty acids (FA), sterols and phospholipids, analyzed by different methods. The root FAs were analyzed by gas chromatography. Lipid types were determined via thin layer chromatography (TLC) in figure 2. In another experiment lipid composition of phospholipids was determined by mass spectrometry (MS). There were no major differences in the root lipids between treatments, caused by boron. Composition of phospholipids was not altered in levels up to 200 ppm of boron in the nutrient solution, as shown in figure 1. It appears that boron tolerance does not depend on changes of root lipids in *Tamarix*. The next step is to examine root membrane proteins.

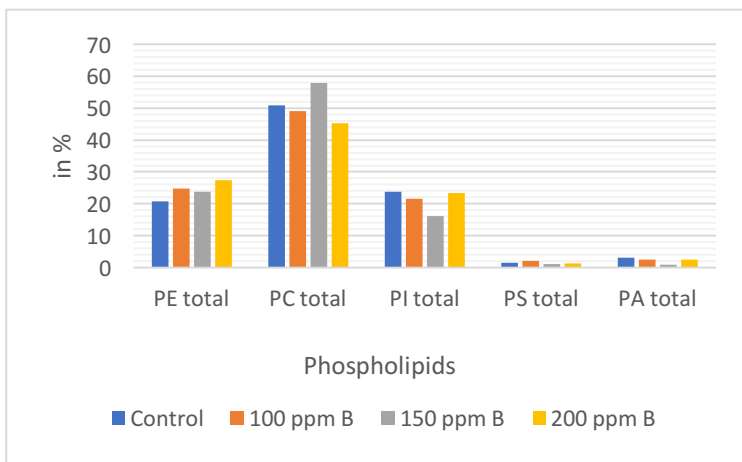


Figure 1 Total percent of phospholipid distribution by MS

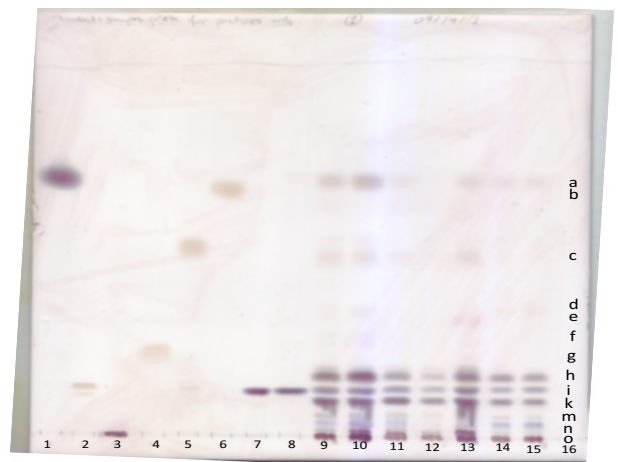


Figure 2 TLC plate of lipids stained with ferric chloride spray

Figure 1: Phospholipid head groups: E – ethanolamine, C – choline, I – inositol, S – serine, A - none

Figure 2 lanes 1-8 standards: 1 – Sterol Oleate (ester); 2 – Diacylglyceride (18:01);

3 – L- α -Pphosphatidylcholine; 4 – Oleic acid; 5 – Triglyceride (olive oil); 6 – Oleyl Oleate (wax);

7 – free cholesterol; 8 – Sitosterol **Lanes 9-15 samples:** 9 – control; 10 – 100 ppm B; 11 – salt;

12 – salt/100 ppm B; 13 – salt/150 ppm B; 14 – 100 ppm B; 15 – 200 ppm B