

## SUPPLEMENTARY ONLINE MATERIAL

### Patterns of functional enzyme activity in fungus farming ambrosia beetles

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#### Figure S1.

*X. saxesenii* laboratory gallery enzyme activity (mean+SE) against 13 specific carbohydrate substrates measured at 45, 62 and 87 days, respectively, after gallery foundation by a single mated female. The same data is presented as a heatmap in figure 1 in the manuscript. For ease of interpretation the polysaccharide substrates are divided into five major groups based on enzyme activity: Cellulases – cellulose, beta-glucan, xyloglucan; Cross-linking glycans – xylan, arabinoxylan, dextran; pectinases – galactomannan, galactan, rhamnogalacturonan, debranched arabinan; Proteases – casein, collagen; and Amylase – amylose. Different letters above horizontal columns indicate significant different means in post-hoc Tukey's tests. Ns = non-significant, k-w = Kruskal-Wallis test with a \* denoting significance at  $p < 0.05$ . Sample sizes for entrance tunnel, brood chamber, and gallery dump respectively are:  $n = 16$ ,  $n = 16$ ,  $n = 11$  at age 45,  $n = 11$ ,  $n = 13$ ,  $n = 5$  at age 62, and  $n = 8$ ,  $n = 8$ ,  $n = 2$  at age 87.

#### Figure S2.

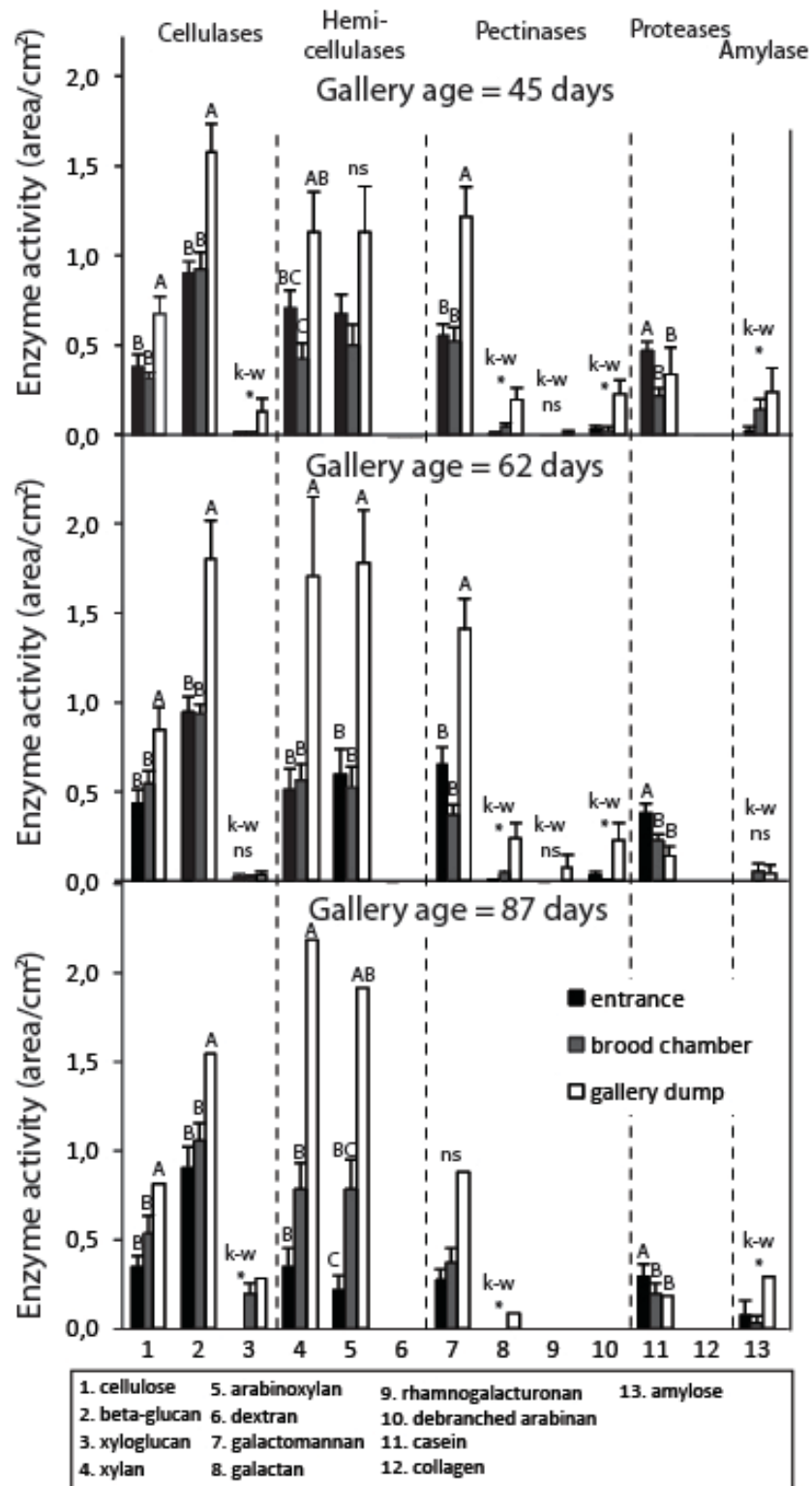
Partial least square regression of gallery enzyme activity at age 45 (A), age 62 (B), and age 87 (C). X loadings are gallery sampling points (brood chamber, entrance tunnel, and gallery dump); Y loadings are specific enzyme activity: cellulos = HE-cellulose (cellulase), betaglu =  $\beta$ -glucan (cellulase /  $\beta$ -glucanase), xyloglu = xyloglucan (cellulase), xylan = *endo*-xylanase, axyl = arabinoxylan (*endo*-xylanase), galman = galactomannan (*endo*-1,4- $\beta$ -mannanase), galac = galactan

(*endo*-1,4- $\beta$ -galactanase), debarab = debranched arabinan (*endo*-arabinase), casein = *endo*-protease, amyl = amylose ( $\alpha$ -amylase). The closer an enzyme substrate is to one of the three samples, the higher the particular enzyme activity is in that sample.

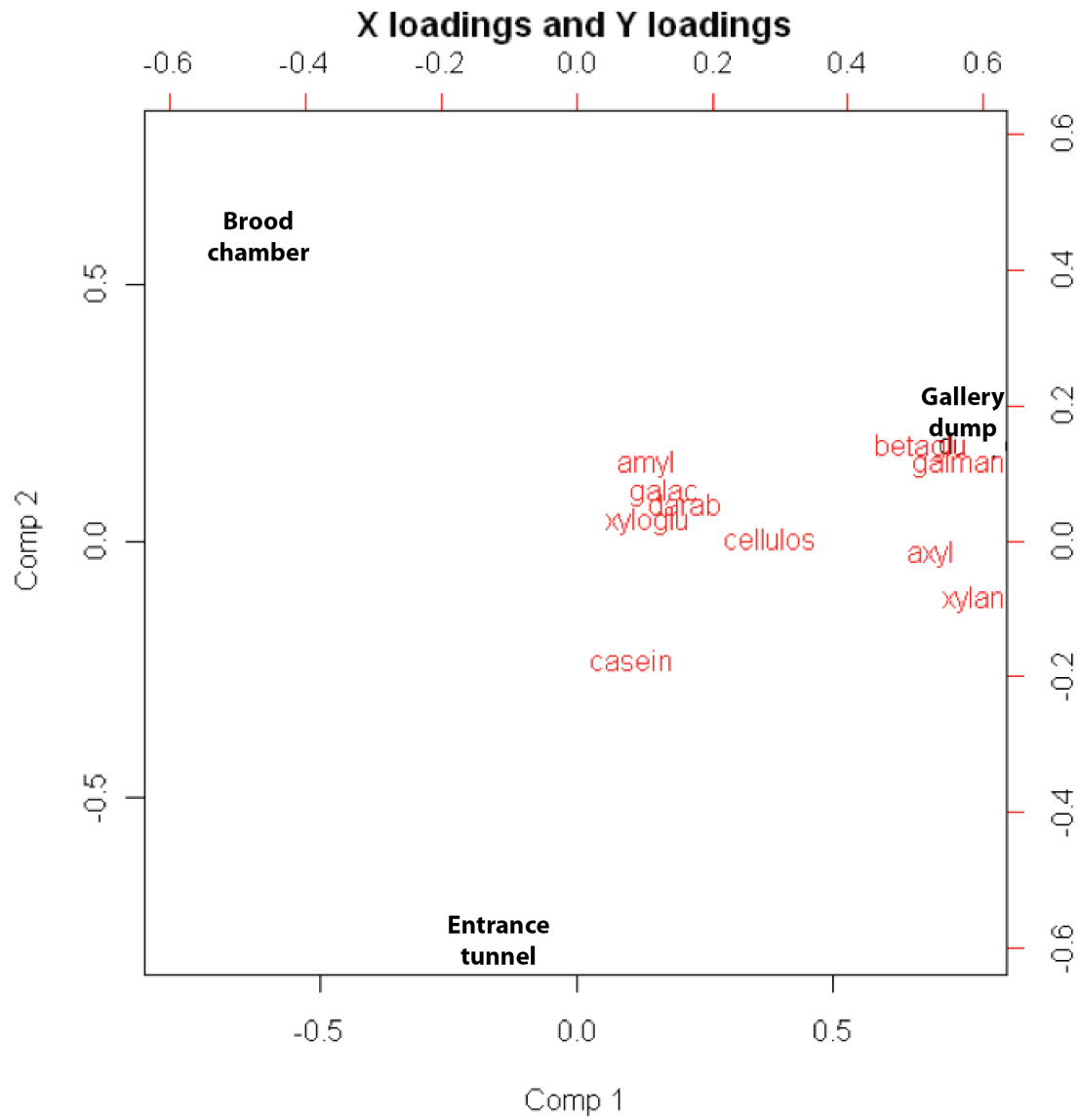
**Figure S3.**

Picture of a *X. saxesenii* brood chamber (top) with 1<sup>st</sup> and 2<sup>nd</sup>/3<sup>rd</sup> instar larvae, pupae and teneral females surrounded by lush mycelial growth of the symbiont *Raffaelea sulfurea* and close-up of two adult females (bottom) inside a gallery with mites. Both pictures are from laboratory galleries and the top picture is taken through the plastic tube containing the gallery. © P. H. W. Biedermann.

# Figure S1

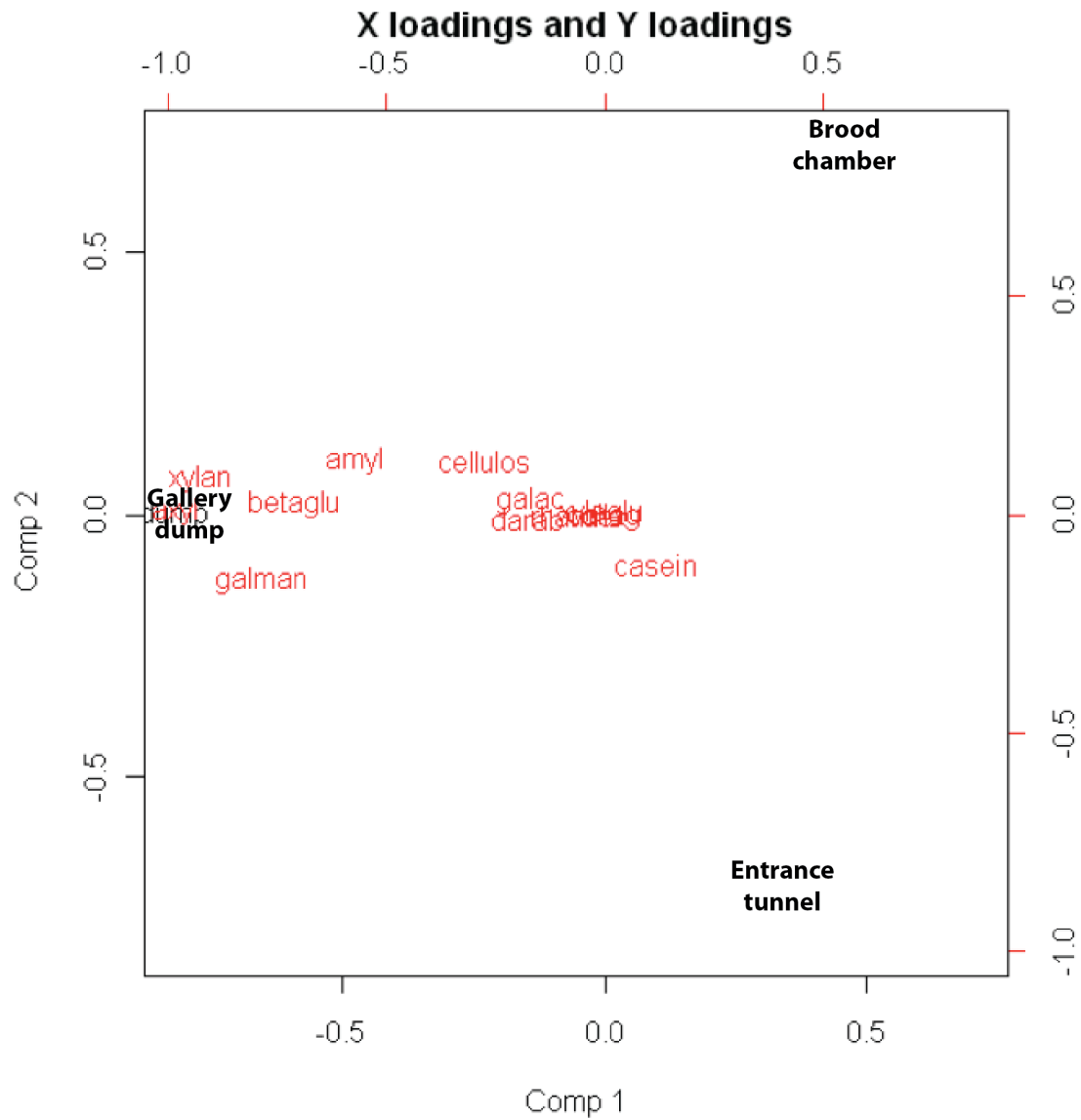


**Figure S2A**  
**Gallery age = 45**

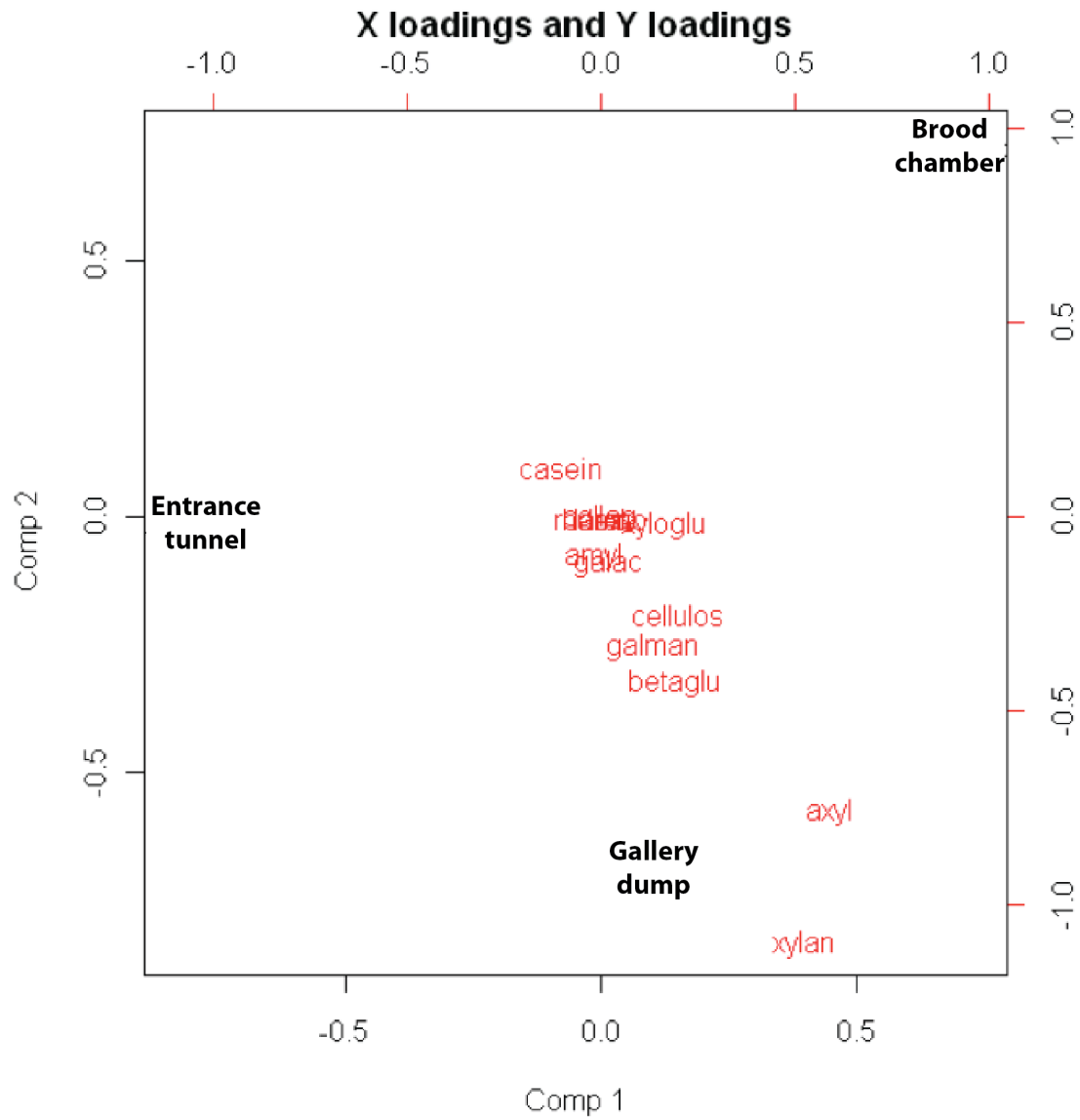




**Figure S2B**  
**Gallery age = 62**



**Figure S2C**  
**Gallery age = 87**



**Figure S3**

