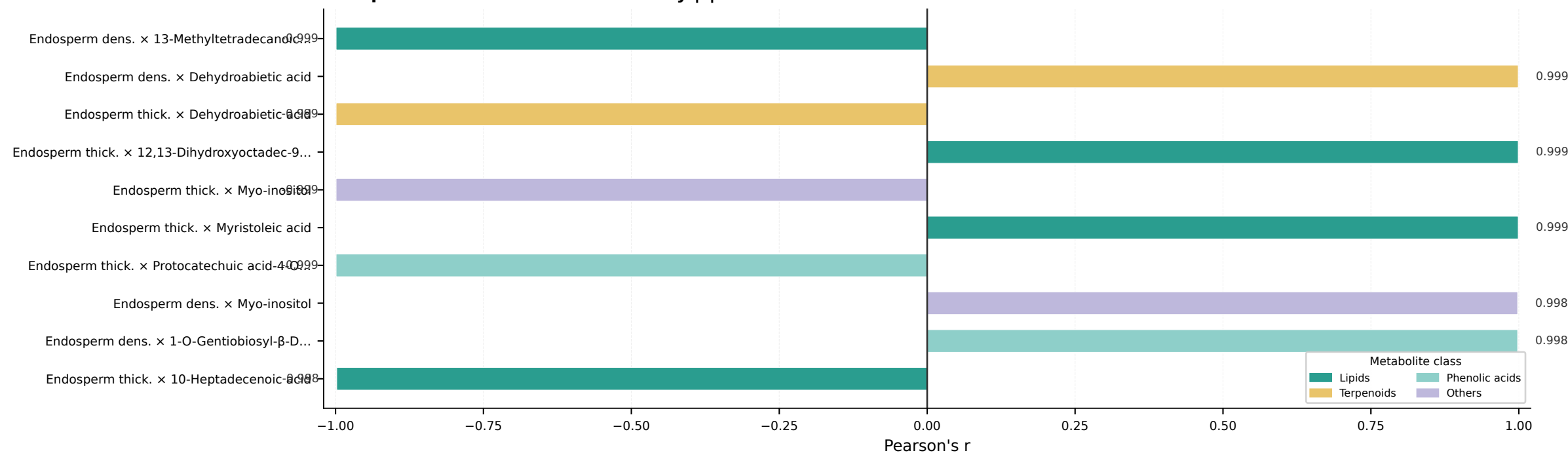


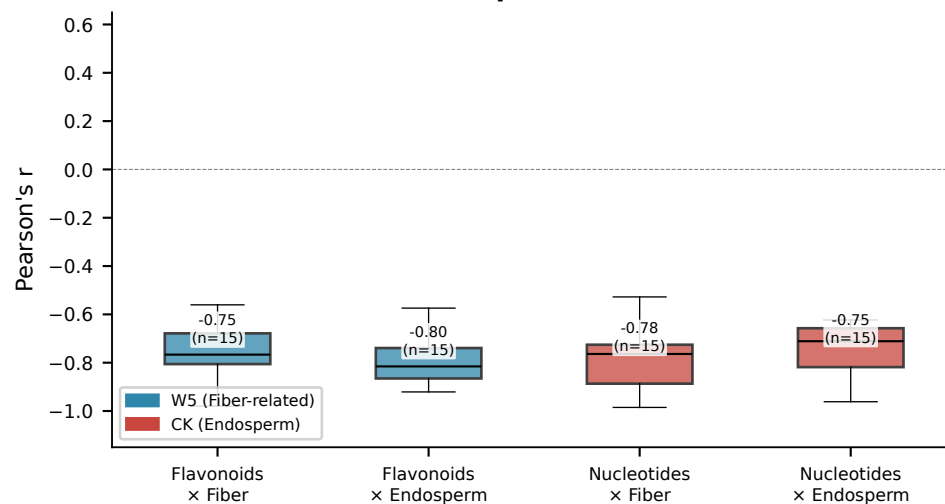
A

A Top CT-metabolite associations by |r|



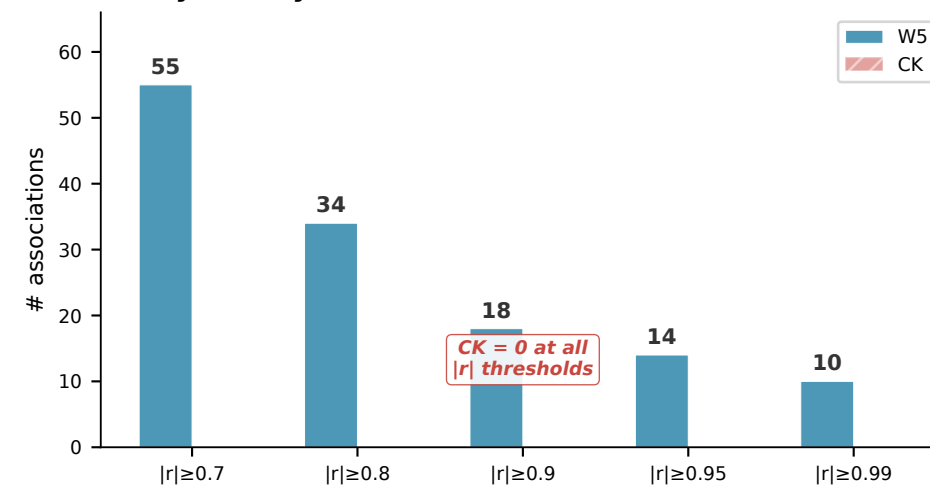
B

B Class-level correlation patterns



C

C Asymmetry: W5 vs CK



D

D Integrated interpretation

Total: 3,376 significant (FDR $q < 0.05$) | 55 at $|r| > 0.99$ | 29 at $|r| > 0.995$

Canalisation diagnostic:

- CK: zero significant at $|r| \geq 0.7$ — stark W5/CK asymmetry
- Genetically homogeneous W5 canalises development vs heterogeneous CK dilutes metabolite-tissue signal

Key pathway insights:

- Flavonoids anti-correlate with structural density (mean $r = -0.83$ fiber, -0.78 shell, -0.71 endosperm)
- Nucleotides correlate with endosperm density ($+0.88$)
- TCA cycle metabolites linked to shell mineralisation