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This work concerns sums of twisted  $L$ -functions over function fields. For example, let  $q$  be an odd prime and  $F = \mathbb{F}_q(T)$ . For each monic  $m \in F^\times$ ,  $m$  squarefree, let  $\chi_m$  be the quadratic character attached to  $F(\sqrt{m})/F$  by class field theory, and  $|m| = q^{\deg m}$ . Let  $\rho_1$  and  $\rho_2$  be quasicharacters of  $F$ . Consider  $\sum_m \rho_1(m)L(s, \rho_2, \chi_m)|m|^{-w}$ , where  $s$  and  $w$  are independent complex variables, and the sum is over all monic  $m$  (with a correction factor if  $m$  is not squarefree). We prove that this is a rational function in  $q^{-s}$ ,  $q^{-w}$  (and give more precise information), and satisfies a finite group of functional equations. This has implications for the growth of  $L$ -functions. We also discuss generalizations. (Received September 25, 2000)