We consider the problem of when a cyclic group of orientation preserving automorphisms $C_p$ of prime order $p$ on a compact oriented surface $S$ of genus $\sigma \geq 2$ is finitely maximal, meaning there is no non-trivial finite supergroup $G > C_p$ of orientation preserving automorphisms of $S$. We show that such a supergroup always exists unless the number of fixed points of the action is maximal (or equivalently, the quotient genus $S/C_p$ is minimal). Moreover, we exhibit an infinite sequence of genera within which $C_p$ is never finitely maximal. (Received September 16, 2015)