Abstract: The basic question we study is the following. Given an abelian algebraic group $A$ defined over $\mathbb{Q}$, a point $\alpha$ in $A(\mathbb{Q})$, and a prime $\ell$, what fraction of primes $p$ have the property that the reduced point $\alpha$ in $A(\mathbb{F}_p)$ has order coprime to $\ell$?

Associated with the choice $\alpha$ and $\ell$ is an arboreal Galois representation. We give surjectivity criteria for this representation and use these to answer the question above in many examples where $A$ is an algebraic torus or an elliptic curve.

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