Let $q$ be a power of a prime number $p$, let $\mathbb{F}_q$ denote the finite field with $q$ elements, and let $k$ denote the algebraic closure of $\mathbb{F}_q$. The aim of the paper under review is to survey some results for $\mathbb{F}_q$-rational structures on Lie modules and related affine varieties. Let $G$ be a connected reductive algebraic $k$-group defined over $\mathbb{F}_q$ with corresponding Frobenius map $F$ and let $\mathfrak{g}$ denote the Lie algebra of $G$. Then any closed conical subvariety of the restricted nullcone of $\mathfrak{g}$ admits an $\mathbb{F}_q$-rational structure if and only if it is the support variety of an $F$-stable $\mathfrak{g}$-module. (Here a $\mathfrak{g}$-module $V$ is called $F$-stable if $V$ arises from some $\mathfrak{g}^F$-module via base field extension.) As an application of this and the Jantzen conjecture on the support varieties of Weyl modules (proved by Jantzen for type $A$ and by Nakano, Parshall, and Vella for the other types) the author shows that the Zariski closures of nilpotent orbits in Lie algebras of the classical groups admit $\mathbb{F}_q$-rational structures when $p$ is large enough.