Let $T$ be a rooted tree with $n$ nodes that have been assigned the labels $1, 2, \ldots, n$. We say that node $v$ of $T$ is a proper node if no descendant of $v$ is assigned a label smaller than the label of $v$. Our main object is to investigate the mean $\mu(n)$ and variance $\sigma^2(n)$ of the number of proper nodes of $T$ over all labellings of all $n$-node trees $T$ in certain families $F$ of rooted trees. In particular, we show that if $F$ is a simply generated family of (weighted) ordered trees whose generating function $y = y(x)$ satisfies a relation of the form $y = x\Phi(y)$, where $\Phi$ is a power series that satisfies some mild conditions, then $\mu(n) = An + B + O(1/n)$ and $\sigma^2(n) = Cn + O(1)$, where $A, B,$ and $C$ are constants that depend on $F$. Explicit expressions are obtained for $A, B,$ and $C$ when $F$ is a binomial family whose generating function satisfies a relation of the form $y = x(1 + sy)^m$. (Received September 07, 2007)