Examples.

If $k = 1$ then TGWA is almost the same as GWA. Typical examples:

1. $U(\mathfrak{sl}(2, \mathbb{C}))$. $R = \mathbb{C}[T, H]$; $t = T$; $\sigma(H) = H - 1$, $\sigma(T) = T + H$.

2. $U_q(\mathfrak{sl}(2, \mathbb{C}))$. Fix $0 \neq q \in \mathbb{C}$. $R = \mathbb{C}[T, k, k^{-1}]$; $t = T$; $\sigma(k) = q^{-1}k$, $\sigma(T) = T + \frac{k^2 - k^{-2}}{q - q^{-1}}$.

If $k > 1$ then most of GWA are still TGWA. Typical example:

3. The Weyl algebra A_n. $k = n$; $R = \mathbb{C}[H_1, \ldots, H_n]$; $t_i = H_i$, $i = 1, \ldots, n$; $\sigma_i(H_j) = H_j - \delta_{i,j}$.

If $k > 1$ there are TGWA which are not GWA in natural presentation. The reason is that $\{X_i\}$ ($\{Y_i\}$) do not commute in general. Or even X's do not commute with Y's if $\mu_{i,j} \neq 1$.

4. $k = 2$; $R = \mathbb{C}[H]$; $t_1 = H$, $t_2 = H + 1$; $\sigma_1(H) = H + 1$, $\sigma_2(H) = H - 1$; $\mu_{i,j} = 1$.

5. Orthogonal Gelfand-Zetlin algebras. Mickelsson step algebras. (later in the talk)