Let $\Gamma$ be a dual polar graph with diameter $D \geq 3$. From every pair of a vertex of $\Gamma$ and a maximal clique containing it, we construct a $2D$-dimensional irreducible module for a nil-DAHA of type \((C^\vee_1, C_1)\). Using this module, we define non-symmetric dual $q$-Krawtchouk polynomials and describe their orthogonality relations. (Received August 13, 2017)