The present study was conducted to evaluate the effects of Grobiotic®-A, a commercial prebiotic, when administered in feed on the growth performance, plasma thyroid hormones and mucosal immunity of great sturgeon (Huso huso). The commercial prebiotic mixture was supplemented in the diets at four different levels (i.e. 0.0% as control, 0.5%, 1% and 2%, in three replicates, 20 fish per replicate) and fed to the fish for an 8-week period wherein 240 fish were cultured in 1,800-L fiberglass tanks that formed part of a flow-through system. Water temperature was maintained at 20.4 ± 1.5°C. Significant changes in growth performance parameters were observed, but only in those groups fed with 1% and 2% prebiotics. Specifically, marked improvements relative to the control group were observed in percentage weight gain, body weight gain, feed conversion ratio and specific growth rate in prebiotic-fed fish. The levels of plasma thyroid hormones, specifically thyroxine and thyroid stimulating hormones were significantly elevated in the group receiving 2% prebiotics. Activities of lysozyme and alkaline phosphatase in skin mucus were significantly enhanced in prebiotics-fed groups, particularly at an inclusion level of 1% and higher (2% group compared to the control). Inhibitory activity of the skin mucus against pathogens, particularly Streptococcus iniae and Yersinia ruckeri, was significantly improved following prebiotic feeding. Taken together, dietary inclusion of Grobiotic®-A promoted growth, modulated thyroid hormones, and enhanced mucosal immunity of H. huso. This prebiotic mixture has the potential for use in improving the growth performance and health status of farmed great sturgeon.