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Spring viremia of carp virus (SVCV) is a rhabdoviral pathogen associated with disease outbreaks in cultured and wild fish worldwide. Common carp (*Cyprinus carpio carp*), and koi (*C. carpio koi*) suffer the highest mortalities from SVCV infections, while other cyprinid fish species have varying susceptibility. Although salmonid fish typically are considered refractory to infection by SVCV, there have been a few reports suggesting infection has occurred in rainbow trout (*Oncorhynchus mykiss*). There have been no reports of Percid fish being infected with SVCV. Since the first North American outbreak of SVCV at a North Carolina koi farm in 2002 there have been eight subsequent detections or outbreaks of SVCV among fish species from the families of *Cyprinidae* and *Centrarchidae* within the US and Canada. Thus, this exotic virus is considered a potential threat to native and cultured fish populations in North America. We performed multiple experimental challenges with fish species from three families (*Salmonidae*, *Cyprinidae*, and *Percidae*) to identify the potential risk associated with SVCV exposure of resident fish populations in North America.