A Population of Italian Ryegrass from Sonoma County California Exhibits Resistance to Fluazifop and Glyphosate. Caio Brunharo*[1], John Roncoroni[2], Bradley Hanson[3]. [1]PhD Student, UC Davis; [2]UCCE Weed Science Farm Advisor; [3]UCCE Weed Science Specialist, UC Davis. *Corresponding author (cabrunharo@ucdavis.edu)

Italian ryegrass (*Lolium perenne* spp. *multiflorum*) is a troublesome weedy species spread throughout California, competing for light, water and nutrients with crops. Its control has been chiefly dependent on herbicides due to their effectiveness and practicality. As result of heavy selection pressure, herbicide-resistant populations of ryegrass have been selected in California. Grapevines, particularly during the establishment years, are vulnerable to direct competition with Italian ryegrass for resources, as well as interference with cultural practices and harvest throughout their life cycle. Italian ryegrass control failure in a vineyard in Sonoma County after a Fusilade + Roundup application was reported in 2015. Greenhouse experiments were carried out to characterize the response of the suspected-resistant population of Italian ryegrass, compared to a previously characterized, susceptible population. Plants were treated with clethodim, fluazifop, glufosinate, glyphosate, paraquat, pyroxsulam, rimsulfuron and sethoxydim at various rates for the construction of dose-response curves. A field experiment was also carried out in the affected vineyard to assess the efficacy of sethoxydim (472.5 g ha^{-1}), paraquat (1050 g ha^{-1}), glufosinate (1145 g ha^{-1}), rimsulfuron (210 g ha^{-1}) and fluazifop (210 g ha^{-1}). Based on the greenhouse experiment, the Sonoma population was highly susceptible to clethodim, glufosinate, paraquat, pyroxsulam and rimsulfuron, and had moderate susceptibility to sethoxydim. On the other hand, the quantity of glyphosate and fluazifop necessary to reduce the growth of the Sonoma population by 50% was 126 and 31 times larger, respectively, compared to the susceptible (GR_{50R}/GR_{50S}). Validating the results obtained in greenhouse, poor control of the Sonoma population with fluazifop (25±3%) and moderate control with sethoxydim (66±4%) was observed in the field. Conversely, glufosinate, paraquat and rimsulfuron provided excellent (91 to 97%) control of the Sonoma population. Although having similar modes of action, fluazifop is in a different chemical group than clethodim and sethoxydim, and the mechanism that confers resistance to these herbicides might be slightly different. It should also be pointed out that, although it controlled Italian ryegrass, pyroxsulam is not labeled in grapes, which is why this herbicide was only tested in the greenhouse. These field and greenhouse experiments confirmed glyphosate and fluazifop resistance in the Sonoma vineyard site but indicated that the population was susceptible to glufosinate, paraquat and rimsulfuron.