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We study a multigrid solution strategy for distributed optimal control problems constrained by semilinear elliptic PDEs. Working in the discretize-then-optimize framework, we solve the reduced optimal control problem using Newton's method. Further, adjoint methods are used to compute matrix-vector multiplications for the reduced Hessian. In this work we introduce and analyze a matrix-free multigrid preconditioner for the reduced Hessian which proves to be of optimal order with respect the discretization. (Received September 16, 2013)