Mosquito Wars: Malaria and Bioterrorism in Italy, 1943–1945

Frank M. Snowden, PhD

By July 1943, Italian hopes for victory in World War II lay in ruins. Axis armies were in disarray on all fronts, the Allies had landed in Sicily, and bombs were falling on Italian cities. In this impending disaster, Mussolini’s dictatorship collapsed on July 25. On September 8, the successor government of Pietro Badoglio reversed sides, declaring war on Germany as a “cobelligerent” of the Allies.¹

Immediately after this volte-face, the German army occupied Italy, imposing a brutal policy of recruiting forced labor, plundering resources, and punishing Italians for their betrayal. German troops also carried out a series of massacres, killing unarmed men, women, and children in a "war against civilians." The distinction between the eastern and western fronts was blurred in the Italian theater.²

VENGEANCE

The Pontine Marshes south of Rome also experienced a war crime. The German army used malaria as an instrument of bioterrorism in violation of the Hague Treaty³ and the Geneva Convention.⁴ The signatories, including Germany, had pledged to inflict no unnecessary harm on civilians and to renounce chemical and biological weapons.

Nazi policy had a special focus in the Pontine Marshes because its reclamation and settlement was a celebrated accomplishment of Italian Fascism. Undoing this project, restoring the swamps, and unleashing malaria were means of inflicting humiliation as well as suffering. Furthermore, a substantial malaria epidemic could slow the Allied armies and complicate the task of governing the liberated territories. Finally, the project was an experiment in Nazi medical science whose goal was to cause rather than alleviate suffering. The result between 1944 and 1946 was a great malaria epidemic in which nearly all of the 150,000 settlers contracted malaria, and especially the virulent form caused by Plasmodium falciparum, despite the fact that the Littoria province was declared malaria-free in 1939.⁵

THE NAZI SCIENCE OF TERROR

The architect of this project was Erich Martini, one of the leading malarialogists in Europe. Martini was Professor of Medicine at Hamburg, an early member of the Nazi Party, a protégé of Heinrich Himmler, and a biological warfare specialist.⁶ He was also an expert on the sanitary infrastructure of the Pontine Marshes who had worked there with his Italian colleague and fellow malarialogist Alberto Missiroli. Their work had contributed to understanding an outstanding malaria puzzle—the natural history and speciation of anopheles mosquitoes.

One aspect of their discoveries was directly relevant: the role of the malarial vector Anopheles labranchiae. Alone of mosquitoes in the former Pontine Marshes, A. labranchiae could breed in both fresh and brackish water. Martini’s experiment, therefore, involved two steps. The first was to stop the powerful pumps installed by Mussolini’s regime to discharge runoff from the hills into the sea. This act, taken in the autumn of 1943, caused the reclaimed land to revert to marshland as it had been before the Fascist bonification program.⁷ The flooding has been understood as a legitimate act of war intended to slow the advancing Allied armies.

This first step, however, was followed by a second step that was useless for military purposes but had dire health consequences. This second step was to put the pumps into reverse action, drawing seawater to heighten the level of salinity. One result was to blight the crops and to harm domestic and farm animals. The most important consequence, however, was to modify the environment in order not only to increase the numbers of mosquitoes exponentially but also to ensure that nearly all were A. labranchiae, the highly efficient vector. This was “species sanitation” in reverse. The Italian malarialogist Alberto Coluzzi, who played a leading role in combating the resulting epidemic, conducted on-site inspections and concluded that the epidemic was “man-made malaria.”⁸

One clue was geographical. Extensive zones were flooded, he discovered, that had no military value. Furthermore, increasing
the salinity was a procedure whose consequences were known best of all to Martini, the expert on *A. labranchiae* and on biological warfare. Furthermore, before departing, the German army took additional measures that maximized the impact on public health. These measures included destroying the sanitary infrastructure by removing as many water pumps as possible and transporting them to Germany while dynamiting the ones they were unable to move. This action had no purpose except to make certain that the impact on the civilian population was lasting and maximally difficult to repair, particularly when the Wehrmacht planted mine fields surrounding the former pumping stations. There was also a sinister logic in the decisions to confiscate the supplies of the antimalarial medication quinine from the Department of Health in Rome and to destroy the boats used to keep the drainage canals free-flowing and clear of vegetation.9

**ITALIAN SCIENTIFIC COMPILITIVITY**

Mussolini’s foreign policy comprehensively destroyed his most celebrated domestic program when his Axis partner carried out the only instance of biological warfare in 20th-century Europe, at the expense of the Italian civilian population. Surprisingly, however, the extent of the epidemic was magnified by Missirolı, the Italian High Commissioner of Health and Martini’s former colleague. He wrote in his own hand that he and other Italians had beseeched the Germans to have due regard for Italian civilians and for international law. Once the experiment had begun, however, Missirolı was anxious to see whether DDT was a weapon potent enough to contain malaria. He, therefore, systematically withheld antimalarial medication from the population to observe the power of DDT alone.10

**REFERENCES**


