

Yuan Longping, Hybrid Rice, and the Meaning
of Science in the Cultural Revolution and Beyond

Abstract

This paper uses the case of hybrid rice to chart changes in the meanings science has carried in China from the Mao era to today. It begins by using Chinese journal articles to reconstruct the 1970s development of hybrid rice technology by a network of diverse historical actors. The author then documents the emergence during the Hua era (1976-1978) of a historical narrative of hybrid rice centered on the figures of Yuan Longping and Hua Guofeng. Finally, the author surveys post-1978 biographies of Yuan Longping to identify changes and continuities in scientific values. The paper demonstrates that, while the postsocialist era has witnessed the replacement of most of the Maoist vision of mass science with a vision far more consistent with the values of international, professional science, the legacy of the Mao era can still be seen in a continued emphasis on certain aspects of Mao Zedong Thought, a strong narrative of nationalist triumphalism, and a celebration of Yuan Longping as an “intellectual peasant.”

Introduction

When renowned rice breeder Yuan Longping (1930-) was of age to begin college, the communists were just months away from victory in the civil war. And so, unlike many of Mao-

era China's leading agricultural scientists, Yuan had no opportunity to travel to the U.S. for graduate school. When Yuan graduated from the newly established Southwestern Agricultural University in 1953, he was assigned to teach at Qianyang Agricultural School (also known as Anjiang Agricultural School) in the remote hills of western Hunan province, where many of his students were young peasants bound to return after graduation to their hometowns. Yuan rose from this humble starting point to become the most famous agricultural scientist in China (Figure 1). In the postsocialist era, his name is a household word. Yet, even though his claim to fame—hybrid rice—was a product of the Mao era, he is almost invisible in Mao-era sources. His celebrity status is a product of post-Mao publicity, and it was by no means a forgone conclusion.

An examination of just how Yuan and the invention of hybrid rice came to be celebrated in the post-Mao era tells us much about changes and continuities in the meaning of science across historical periods in the People's Republic of China. Mao-era political ideology produced an ideal of science that downplayed individual achievements and highly emphasized mass mobilization and local self-reliance. With the ideological transformation of China after 1978, this ideal changed to embrace a professional model of science glorifying individual achievements made legible on an international stage dominated by China's former enemy, the United States, and its allies. However, the values established in the Mao era have by no means disappeared. Rather, the valorization of Party leadership along with certain aspects of Mao Zedong Thought, the expectation that scientists should embody both professional and mass qualities, and the salience of nationalism in the face of geopolitical power structures stand as important values that continue to shape the significance of science in China today.

Yuan Longping from the Vantage of Mao-Era Sources

Yuan authored only one article during the Mao era. In the April, 1966 issue of *Chinese Science Bulletin*, Yuan reported on his discovery of mutant male-sterile rice plants, the first

critical step on the road to tapping the benefits of hybrid vigor in rice.¹ Hybrid corn had long since been put into production around the world, but the challenges with self-pollinating plants like rice and sorghum were much greater. Rice in particular has a very low rate of cross-pollination—more than 95 percent of the time rice seeds are produced by the male and female parts of a single rice plant. Thus, in order to hybridize two rice plants, one of the plants must first have the male parts removed so that it will not fertilize itself. It can then be exposed to the pollen from another plant so that its seeds will contain the genetic material from both plants. This was already a standard practice in China, as in many other places, in the production of new varieties of rice. However, the phenomenon of "hybrid vigor" (or heterosis) applies only to the first generation (called F₁) of plants produced through this crossing. So, the new variety may have many useful qualities and be worth stabilizing and putting into production as an "improved variety," but those first-generation hybrid plants will typically perform significantly better than the later generations. The trick with "hybrid rice," as with "hybrid corn," was to find a convenient way to repeat the hybridization process on a large scale every year, so that farmers could be provided with large quantities of seed that would grow into first-generation hybrid plants. For rice, this meant finding plants that were already male-sterile so that each individual plant would not have to be sterilized by hand. Yuan's discovery of a male-sterile plant was thus worthy of attention from China's most important science journal.

After this one article, published on the eve of the Cultural Revolution, Yuan's name disappeared from print until several months after Mao's death and the fall of the Cultural Revolution radicals. However, an article published in 1972 in *Agricultural Science and Technology News* under the name of the Qianyang School of Agriculture Scientific Research

¹ Yuan Longping, "Shuidao de yongxing buyunxing" [Male Sterility in Rice], *Kexue tongbao* 1966, no. 4: 185-88. [PUBLISHER, PLEASE NOTE THAT MOST CHINESE JOURNALS USE THE YEAR OF PUBLICATION AS THE VOLUME NUMBER.]

Group was undoubtedly his creation. By this time, Yuan and his colleagues had given up on the male-sterile line they had identified in 1964 among the cultivars in their fields, but after a painstaking search, they had found on the island of Hainan a male-sterile plant of a wild rice variety. In the 1972 article, Yuan described the next challenge: identifying the second genetic strain needed for the three-line method of producing hybrid seed. This was the so-called "maintainer line"—the strain that when crossed with the male-sterile line would preserve the male-sterile trait and so produce more male-sterile plants that could then be crossed with the "restorer line" in order to generate the desired F_1 hybrid seeds (Figure 2). Drawing on Mao's contribution to dialectical materialism, Yuan reasoned that the emergence of the male-sterile line was "the result of the movement of contradiction," and that the "maintainer line and sterile line were two sides of the same contradiction."² In framing his research questions this way, Yuan was following common practice not only in scientific research in general, but also specifically in hybridization work.

One other article associated with Yuan dates from the Mao era. This work is significant for its claim that research into hybrid rice had been stymied by the "traditional" theory that self-pollinating plants like rice do not display hybrid vigor. It appears to be the first account of the alleged conflict, which has been widely repeated in biographies about Yuan in the postsocialist era. Unlike many later references, in this article Yuan provides a source for this "traditional" theory: a "foreign" book titled *Principles of Genetics*. However, I have not found any articles in Chinese science journals that suggest that this theory was commonly referenced, much less influential or paralyzing on, Chinese breeding theory or practice. Moreover, by the mid-1960s, hybrid sorghum—another self-pollinating plant—was already being widely popularized. I will

² Hunan sheng Qianyang diqu nongxiao keyanzu, "Xuanyu shuidao xiongxing buyu baochixi de yidian tihui" [Some Experiences in Selecting a Male-Infertile Maintainer Line in Rice],

Nongye keji tongxun 1972, no. 10: 8-9, on 8.

explore this issue further below; for now, what is worth noting is that in 1974 political culture, it was useful to be able to identify a Western antagonist against which to set China's research achievements.

Until late 1976, the research on hybrid rice received scant attention from popular news sources, and it appeared surprisingly seldom even in the national scientific journals. However, provincial-level journals and archival materials make clear that hybrid rice research was proceeding rapidly and involved research institutes and extension systems around the country. The involvement of research units representing not only numerous provinces but also county-level organizations was highly characteristic of the specific style of scientific research developed during the Mao era, which involved the massive mobilization of human resources.³

Where was Yuan in all of this? Although he was not mentioned by name, his school was routinely recognized for its importance in pioneering the research on hybrid rice, and there is no doubt that Hunan's special place in the record owes first and foremost to his efforts.⁴ Still, the story that emerges from the Mao-era documents when considered on their own is not that of the lone heroic scientist that we will encounter when we turn to Yuan's postsocialist biographies. True to the ideals of Maoist science, we find instead an aversion to celebrating individual scientists—though occasionally Yuan's peasant-student assistant Li Bihu might be mentioned by name—and an emphasis instead on the collaborative nature of the work and the large number of people participating.⁵

3 Xiong Weimin and Wang Kedi, *Hecheng yi ge danbaizhi: Jiejing niuyi daosu de rengong quan hecheng* [Synthesize a protein: The story of total synthesis of crystalline insulin project in China] (Jinan: Shandong jiaoyu chubanshe, 2005).

4 Using the China Academic Journals database, I found more than a dozen such references from 1971 to 1976.

5 For Li Bihu, see Jiangxi sheng Yichun diqu nongyeju et al. ed. and pub., *Zenyang zhonghao*

As a 1972 article emphasized, the development of effective hybrid rice technology was conceived as part of a larger "mass hybrid breeding scientific experiment movement" that had already made great strides in corn and sorghum.⁶ Further characteristic of Mao-era agricultural science was the integration of research and extension. The articles published in this early period covered a range of issues, from identifying and crossing lines to breed suitable varieties, to producing seed, testing the varieties in different places, and developing effective cultivation practices. Most importantly, the early success of the hybrid rice program required very rapid training in seed production for vast numbers of peasants. Peasants today remember the production of hybrid rice seed as a complicated technology that was difficult to learn; often one young member of the scientific experiment group was selected to go to Hainan for intensive training and then returned to the village to lead the work. The greatest challenge was caring for the male and female plants separately and timing their development so they would flower simultaneously, thus making hybridization possible.

Mass science was also local science. The notion that individual communities should be responsible for seed propagation should interest critics of the green revolution and agribusiness more generally. One of the most problematic aspects of new seed technologies—including both the production of hybrid seed and the use of GMOs—is the way it strips farmers of the ability, or even the right, to preserve and select their own seed for future plantings.⁷ The introduction of

zajiao shuidao [How to plant hybrid rice], (N.p., 1975), 11.

6 Shuidao xiongxing buyu yanjiu xiaozu, "1972 nian shuidao xiongxing buyu shiyan xiaojie" [Summary of 1972 Experiments on Male Sterility in Hybrid Rice], *Nongye keji ziliao* 1972, no. 2: 1-8, on 5.

7 The critical literature on this issue is vast. For just a few examples, see Jean-Pierre Berlan and Richard Lewontin, "The Political Economy of Hybrid Corn," *Monthly Review* 38 (1986): 35-47; Richard Lewontin, "Agricultural Research and the Penetration of Capital," *Science for the*

hybrid seed propagation in Mao-era China was highly unusual in its emphasis on building local expertise and self-reliance.

Finally, if the story were told from the perspective of Mao-era sources, the production of hybrid rice would be as much a political struggle as a technical achievement. Some materials placed hybrid rice research and extension thoroughly in the context of ongoing political campaigns: for example, criticizing Lin Biao and Confucius; taking scientists to task who selected esoteric research subjects rather than topics central to the mission of socialist construction; warning of class enemies who might disrupt hybrid rice research and production; calling to arms against the theory of innate genius, the Western slave mentality, and superstitions of all sorts; and, in 1976, struggling against Deng Xiaoping.⁸

As told from Mao-era sources, the story of hybrid rice was an ideal representation of mass science. The heroic achievements of individuals, especially intellectual individuals, had no place there. Rather, science was collaborative, involving peasants as well as scientists and

People 14, no. 1 (1982): 12-17; Vandana Shiva, "Seeds of Suicide and Slavery versus Seeds of Life and Freedom," *Aljazeera*, March 30, 2013.

8 Guangxi shiyuan shengwuxi shuidao 'sanxi' keyan xiaozu, "Kaizhan shuidao zazhong youshi liyong jichu lilun yanjiu de yixie tihui" [Some Experiences Developing Basic Theoretical Research on Heterosis in Rice], *Guangxi shiyuan daxue xuebao* 1975, no. 1: 10-12; Jiangxi sheng Yichun diqu nongyeju et al ed. and pub., *Zenyang zhonghao zajiao shuidao* [How to plant hybrid rice] (1975); Xiangzhou xian shuidao zayou liyong tuiguang lingdao xiaozu, "Jiaqiang lingdao kaizhan zajiao shuidao shizhong, shifan, tuiguang" [Strengthen Leadership in Developing the Testing, Modeling, and Extension of Hybrid Rice], *Guangxi nongye kexue* 1976, no. 2: 21-23; Guangdong sheng Hainan Lizu Miaozu zizhu zhou kejiju qingbaosuo, "Yi jieji douzheng wei gang, dali tuiguang zajiao shuidao" [With Class Struggle as the Key Link, Vigorously Extend Hybrid Rice], *Yichuan yu yuzhong* 1976, no. 4: 23.

integrating theory and practice, research and extension, breeding and cultivation. Contrary to the technocratic vision that has dominated so much agricultural development work around the world, hybrid rice was in these Mao-era sources far more than just a technical achievement. Instead, it was part and parcel of every other aspect of the ongoing social and political revolutions that defined Chinese socialism under Mao.

The Emergence of Yuan Longping in the Hua Guofeng Interregnum

After Mao died in September, 1976, politics in China underwent a series of profound shifts that transformed the story that could be told about the invention of hybrid rice. The clearest change was the emerging emphasis on Yuan Longping himself. Yuan's rise to stardom was extraordinarily sudden and rapid, and responsibility for this lies primarily with Hua Guofeng. When Mao died and left Hua Guofeng in command, Hua faced enormous challenges: not only did he have very large revolutionary shoes to fill, but he had competitors, led by Deng Xiaoping, waving the attractive flag of science and technology. Hua thus scrambled to present himself as a champion of both Mao's revolutionary line and scientific modernization, upholding mass science alongside the "Four Modernizations" for which Deng and others had been arguing since the early 1960s. Hua had been party secretary of Hunan from 1970 to 1976, and he had been given responsibility nation-wide for agricultural development. The story of hybrid rice was one of a handful of exciting Hunanese examples of agricultural mass science that Hua could use to bolster his image. In this new story, Yuan Longping became an ideal hero, with the "Gang of Four" as villains and Hua Guofeng as a kind of Party godfather. Yet even with the introduction of the heroic scientist, Hua-era publicity on hybrid rice painted the research carefully within the lines of Maoist science, upholding the principles of mass mobilization and collectivism.

Yuan's introduction to the public came in a December, 1976 article in *People's Daily* titled "How Hybrid Rice Was Successfully Cultivated"; in that same moment, Hua himself

became closely associated with the invention of hybrid rice.⁹ In subsequent reporting, with each source drawing from its predecessors, the story became more highly elaborated and certain key elements cemented in place. Hua had seen an exhibit about the results of Yuan's research and personally awarded a prize to Yuan's research team.¹⁰ Beginning with his efforts to support Yuan Longping in 1970, Hua is said to have "encouraged science and technology personnel to give three-line rice research over to the masses to do, to develop this research from a small number of specialists' experiments to a new phase of a thousand armies and ten thousand horses." The article characterized hybrid rice research as representing commitments to self reliance, squashing superstition, overturning "the Western-slavish and conservative mentality that assumed 'if foreign countries could work on hybrid rice for years without success, we will not be able to succeed either," "refuting the outdated genetics theory that 'rice is a self-pollinating crop, and so hybridizing it will not produce vigor,'" and exposing the "Gang of Four's' counterrevolutionary crimes of meddling with the science and technology world."¹¹

9 I have found only one mention of Hua in any of the Mao-era articles on hybrid rice available through the China Academic Journals database, and that is an oblique reference to a speech he gave at a national agricultural conference in 1973. "Wosheng zhaokai shuidao xin pinzhong xuanyu ji zazhong youshi liyong yanjiu xiezuozuotanhui" [Sichuan Coordinating Conference on Research in Selection of New Rice Varieties and Heterosis], *Sichuan nongye keji* 1973, no. 1: 8-11.

10 Nie Leng and Zhuang Zhixia, *Lüse wangguo de yiwān fūwēng* [Billionaire of the green kingdom] (Beijing: Huayi chubanshe, 2000).

11 "Di wu ci quanguo zajiao shuidao keyan xiezuohui zonghe jianbao (chubao)" [Summary Report on the Fifth National Coordinating Conference on Scientific Research on Hybrid Rice], *Hunan nongye keji* 1977, no. 3: 1-5.

Yuan himself authored a few articles during the Hua era, and these too credited Maoist philosophy for the success of the research. In an article he co-authored with his two peasant-student assistants, Li Bihu and Yin Huaqi, Yuan claimed to have been inspired by Mao's famous essay "On Contradiction" to understand the "internal cause" of male sterility in rice; this helped him overcome any doubts raised by foreign geneticists, whose assumptions that rice would not display hybrid vigor resulted in their failure to inquire into the internal nature, rather than merely the outward appearance, of the organism. Yuan credited the research with reflecting just about every Maoist value in the book: mass mobilization, self-reliance, socialist cooperation, and courage in going their own road (an old slogan associated with the split from Soviet revisionism). And the new rice had reportedly won the support of that crucial segment of the population, the poor and lower-middle peasants, who dubbed it "revolution rice."¹²

Rewriting the History of Hybrid Rice in Postsocialist China

The materials on hybrid rice published since the rise of Deng Xiaoping in 1978 have had a complicated dance to perform. When Hua's brief administration ended, Deng Xiaoping seized the banner of the Four Modernizations while abandoning Hua's commitment to the Maoist mass line. The story of hybrid rice had to become one of triumph that brought glory to the Chinese nation and the Chinese Communist Party, without seeming to give credit to the utterly discredited Cultural Revolution.

The vessel for this new story is Yuan Longping himself, as presented in a veritable industry of Yuan Longping biographies that borrow liberally from one another and so create a strong dominant narrative about the invention of hybrid rice. Yuan is the key plot element, while the network of research and extension organizations are of little significance, and the "masses"

¹² Yuan Longping, Li Bihu, Yin Huaqi, "Tantan zajiào shuidào: Dui shuidào sanxi de renshi" [On hybrid rice: Knowledge of three-line rice], *Shengming shijie* 1977, no. 1: 41-42.

figure mostly as impoverished peasants whose hunger inspires Yuan to help China produce more rice for its people. Marxism and some of the politically safer strands of Mao's philosophy are claimed as key influences on Yuan's Mao-era research, and credit is given to the Party as a whole for its invaluable support. At the same time, the story of hybrid rice follows the template of Cultural Revolution sagas—with heroes and villains in all the expected places, and strikingly little mention of the vast agricultural science network that supported hybrid rice—such that success appears to come in spite of, rather than because of, Cultural Revolution-era approaches to the organization of agricultural science.

Yuan's biographies present him as the child of intellectuals, and emphasize that in the remote hills of western Hunan he retained a sense of himself as an intellectual: he is even said to have brought his violin to western Hunan with him, and to have especially loved to play romantic melodies like Schumann's *Fantasia* (Figure 3).¹³ In keeping with the heroic individualist narratives familiar in "bourgeois-scientific" societies around the world, biographies consistently characterize Yuan as a lone scholar in the wilderness, boldly going into uncharted waters. In the face of much doubt and hostility, he makes his discoveries by himself or in the company of his few supporters.

The story of hybrid rice reinforces the dominant narrative on the failures of the Cultural Revolution. In postsocialist accounts, what saved Yuan and his hybrid rice from Cultural Revolution radicalism was the leadership of good Party officials. In a 2001 *Guangming Daily* article cited in one popular biography, Yuan put it this way: "Some people cannot understand how China could make a breakthrough in hybrid rice in such a time as the 'Cultural Revolution.' There are numerous reasons, I think. For example, sincerity and solidarity between colleagues, close collaboration between people in various areas. However, what I want to emphasize is how

¹³ Xie Changjiang, *Zajiao shuidao zhi fu: Yuan Longping zhuan* [The Father of Hybrid Rice: A Biography of Yuan Longping] (Nanning: Guangxi kexue jishu chubanshe, 1990).

the Party nurtured this wonderful flower—hybrid rice."¹⁴ These are the bright threads that run through each of the accounts. Yuan became the target of criticism in the early days of the Cultural Revolution because he had published in a professional journal and because he had once dared to suggest a revision to Mao's famous "8-Character Charter" for agriculture. But he was saved from the "cowsheds" that served as prisons for so many other intellectuals by the intervention of an official in Beijing who had read his article and recognized the value of his research, ordering not only that Yuan should be left alone but even that he should have some funding.¹⁵ A few years later, Yuan was sent to work in a coal mine in order to "temper" himself and reform his thought. He was saved again when his assistants Li Bihu and Yin Huaqi—who came from poor peasant backgrounds and thus were politically secure—sent a telegram directly to the State Science Commission, which sent a representative to western Hunan to investigate. The students reportedly served him dinner and tearfully told of Yuan's great virtues and sufferings. The result was that Yuan was quickly able to return to his research. Soon after, the provincial authorities began taking more notice and moved Yuan and his assistants up to the more central and well supplied Hunan Agricultural Academy.¹⁶

14 Deng Xiangzi and Ye Qinghua, *Bu zai ji'e: Shijie de Yuan Longping [Never Again Famine: The World's Yuan Longping]* (Changsha: Hunan wenyi chubanshe, 2007), 195. Translation from the English version of this book: Deng Xiangzi and Deng Yingru, *The Man Who Puts an End to Hunger: Yuan Longping, "Father of Hybrid Rice"* (Beijing: Foreign Languages Press, 2007), 200. The original article was Yuan Longping, "Cun cao yang chunhui, quan kao dang lingdao" [Little Shoots Growing under Spring Sunshine, Everything Depends on Party Leadership], *Guangming ribao*, 6 July 2001, <http://www.sina.com.cn>.

15 Deng Xiangzi and Ye Qinghua, *Bu zai ji'e*, 79-85.

16 Qi Shuying and Wei Xiaowen, *Yuan Longping zhuan [Biography of Yuan Longping]* (Taiyuan: Shanxi renmin chubanshe, 2002), 141-47.

One of the most politically transparent changes to the story after 1978 is the waning role of Hua Guofeng and the celebration instead of Deng Xiaoping. It seems that the chief person who continues to recognize Hua rather than Deng is Yuan himself.¹⁷ In contrast, Yuan's biographers tend to refer to Hua without fanfare or even to neglect him entirely. For example, a 1990 biography told the story of Hua's encouragement of Yuan in 1970 without crediting Hua at all, instead just referring to "a provincial leader." But the biographer favored Deng and his technocratic platform with reference to a little ditty attributed to "a peasant in Hunan": "In resolving our food problem, we have relied on 'two Pings.' We rely on Deng Xiaoping (for the responsibility system) and we rely on Yuan Longping (for hybrid rice)." The parentheticals were added by the biographer, who further explained, "This means that first they rely on policy and second on science."¹⁸ Along with the shift to emphasizing Deng has come a shift to downplaying or even criticizing collectivism. In postsocialist materials, the mass scientific organizations that appeared so frequently in Mao-era sources are now sidelined or downright disparaged. And while the Mao- and Hua-era sources emphasize the thorough integration of research and extension, the postsocialist biographies rarely mention extension.

The transformation of science under the postsocialist era's new political, economic, and ideological conditions can be seen wherever one looks, including in some very quirky corners. In May 1979, U.S. industry giant Armand Hammer took fifteen executives from his corporation Occidental Petroleum to China.¹⁹ They discovered through "casual conversation" that China had

17 Yuan Longping and Xin Yeyun, *Yuan Longping koushu zizhuan* (Changsha: Hunan jiaoyu chubanshe, 2010), 241.

18 Xie Changjiang, *Zajiao shuidao zhi fu*, 75, 89.

19 Armand Hammer was the son of a prominent American communist, named for the emblem ("arm and hammer") of the Socialist Labor Party, and one-time resident American capitalist in the Soviet Union under Lenin's New Economic Policy. Hammer met Deng Xiaoping at a rodeo in

developed a method for producing hybrid rice. This led to an exchange agreement between Occidental's agricultural subsidiary Ring Around Products and the newly formed China National Seed Corporation: China would get hybrid cotton, and the U.S. would get hybrid rice. The exchange was so exciting to Ring Around Products that they made a film about it, with footage of Yuan Longping at home and work in Hunan. The film's treatment of Yuan's experiences in the Cultural Revolution reflects the politics of 1982, which were starkly different from those in play in the 1970s, and reflect instead the same perspective that we see in post-1978 Chinese sources. The narrative is entirely textbook, with images of intellectuals in dunce caps resolved by the trial of Jiang Qing. It also includes a segment depicting two Chinese rice breeders who came to the U.S. to help launch Ring Around Products' hybrid rice project. Footage of a major U.S. metropolis is quickly followed by a clip of two men in classic blue suits of Mao-era China riding bicycles through a quintessentially U.S. landscape. Their existence in the U.S. is meant to appear hilariously incongruous. The Chinese in their blue suits are presented as rubes—naive babes just entering the modern, capitalist world. And in some ways this was accurate: new to intellectual property law, China did not get the best of the deal with Ring Around Products, which gained the right not only to grow hybrid rice in the U.S. but also to market it internationally.²⁰ If the film retains anything of the Mao-era vision for mass science, it lies in the depiction of the rice breeders with their blue suits and bicycles. But this is mass science through a thoroughly colonialist gaze, appropriated by the corporate U.S., missing the revolutionary politics that made it a challenge to capitalist science. Mass science had become disempowered in

Houston during Deng's famous introduction to the United States in 1978, and within months Hammer had booked his China trip. China's embarkment on the "Four Modernizations" seemed to Hammer to herald opportunities for American business like those of the Soviet Union under Lenin in the 1920s.

20 Deng Xiangzi and Deng Yingru, *The Man Who*, 205-6, 223.

the hands of global capitalism—disempowered both at the symbolic level (the "cuteness" no longer has any power to provoke or inspire) and at the practical level (China got the short end of the stick in the exchange with Ring Around).

On a more individual level, Yuan himself has failed to achieve the top honor for Chinese scientists—election to the Chinese Academy of Sciences—despite having been nominated on three separate occasions. Instead, he was elected in 1995 to the Chinese Academy of Engineering. This has angered some of Yuan's supporters, who feel that his accomplishments have not been properly appreciated. However, the larger question here is what constitutes "science." In Mao-era China, there would have been little question that developing a technology for hybridizing rice counted as science. But with the embrace of more international standards, the criteria have turned from practice to theory, from applied to basic science.²¹ It is a mark of just how seriously the postsocialist Chinese state embraces these standards that Yuan's tremendous fame and popularity were not enough to win him a place in the Chinese Academy of Sciences.

The Legacies of the Mao Era in Postsocialist China

The political economy changed dramatically after 1978, and with it the ideological significance surrounding hybrid rice. Nevertheless, continuities in the historical narratives demonstrate that the Mao era has left important legacies in the way not only the story of hybrid rice, but science more broadly is understood in today's China.

The inspirational role played by Marxist philosophy, and especially Mao Zedong Thought, represents one key continuity between pre-1978 and post-1978 stories of hybrid rice:

²¹ The continued emphasis in Yuan's biographies of his triumph over the Harvard geneticists (discussed in more detail below) is in part an effort to claim that Yuan has made a contribution to basic genetics research and not just a technical invention. This is the kind of claim scientists need to be able to make if they are to hold their own in the realm of professional, international science.

these are the crucial narrative elements that ensure criticisms of the Cultural Revolution will not undermine the legitimacy of the socialist state itself. In his recent oral history, Yuan claimed to be greatly influenced by Mao's "On Contradiction." He explained, "With respect to 'On Contradiction,' internal contradictions actuate the motive force in the development of all things. Hybrid vigor is simply the hybridization of two varieties that are genetically different. Only when there is contradiction is there vigor..."²² The continuity of emphasis on "On Contradiction" is striking: it remains a part of the story because it probably was truthfully an early inspiration for Yuan, and also because in postsocialist China it represents Maoist philosophy in a way that shores up the Party's legacy without threatening the new political-economic order.

Another important continuity in the narrative lies in the consistent inclusion in Yuan's biographies and in his oral history of his conflict with foreign authorities who claimed that self-pollinating crops like rice do not display heterosis when hybridized. To take just one example: "Yuan threw down a gauntlet in front of famous international authorities and their conclusions. The famous American geneticists Sinnott and Dunn's 1950s -1960s American college textbook *Principles of Genetics* asserted that rice is a self-pollinating crop and so has no heterosis when hybridized... This was forbidden territory, a kind of 'Thunder Lake' [a famous lake that people historically did not dare to pass]. But Yuan Longping believed that his own theory was proven scientifically on the foundation of scientific knowledge and possessed strict internal logic. He would break through that forbidden territory, pass that Thunder Lake."²³

The notion that Yuan's achievement represented an overturning of Western scientific authority is greatly overblown, not only in the rhetoric employed, but also in the facts of the case: Sinnott and Dunn's assertion about heterosis in rice by no means represented consensus

²² Yuan Longping and Xin Yeyun, *Yuan Longping koushu*, 234-35.

²³ Qu Chunlin, Xiang Biao, and Wang Jue, "Zajiao shuidao wenhua" [Hybrid Rice Culture],

Hunan shehui kexue 2006, no. 5: 159-162, on 160.

among Western scientific circles, and in any case it had clearly not impeded the development of research on heterosis in China prior to Yuan's initiative. The untenability of the claim makes its prominence in the biographies all the more significant: it testifies to the deep and sustained political resonance of the account. The story's spin certainly changed: for one thing, taking down Harvard geneticists became less of an anti-elitist triumph and more of a straight-up nationalist victory; and for another, the post-1978 biographies were careful to include another anecdote emphasizing that Yuan's challenge did not represent a Lysenkoist rejection of genetics. On the whole, however, the mythology represents a strong continuity in efforts to identify areas where China could claim scientific achievements over the West.

With the "masses" and their "mass scientific movement" no longer holding water, where mass science values appear in the postsocialist biographies, they are embodied in Yuan himself. So, for example, Yuan is said to have emphasized experiment and study in the fields rather than classroom learning. He made do with meager equipment and even emphasized "learning from practice and learning from peasants."²⁴ Echoing decades of mass-science rhetoric, Yuan is said to have maintained, "We technicians should learn from farmers, for they have rich farming experience." For example, Yuan adopted a fertilization method from local peasants: two people holding a rope between them would walk across a rice paddy, allowing the rope to graze the ears of the rice to release the pollen.²⁵ Consistent with a strong Mao-era expectation of scientists,

24 Qi Shuying and Wei Xiaowen, *Yuan Longping zhuan*, 51.

25 Deng Xiangzi and Ye Qinghua, *Bu zai ji'e*, 121. Translation from Deng Xiangzi and Deng Yingru, *The Man Who*, 127-28. The use of the rope is corroborated in many places, including Yuan Longping and Xin Yeyun, *Yuan Longping koushu*, 151. An interviewee who grew up in rural Zhejiang remembers people using this method when beginning the local production of hybrid rice.

Yuan is frequently praised for being willing to get down-and-dirty in the field.²⁶ One biography applauded his willingness to walk barefoot through manure-laden paddies. And in a touching moment, it reconstructed a conversation between Yuan and a peasant. The peasant asks him why "cultured" people like Yuan would want to live alongside "us muddy-legs." Yuan replied that if it weren't for "us muddy-legs," the world would surely starve.²⁷

However, Yuan is by no means painted as just a peasant. His earthy side is always balanced by examples that highlight his status as an intellectual. One biography characterized him as an "intellectual who grew up in a big city but embraced a simple life deep in the desolate mountains."²⁸ Another called him "an intellectual who still retains a peasant's manner," explaining, "He did not put on airs or seek special privileges."²⁹ Yuan affirms he is an "intellectual peasant."³⁰ A 2002 biography captures this image well in a scene said to take place in 1973, when Yuan was just beginning to see the results of hybrid vigor in his test plots. One night he pulled out his violin and brought it out to the fields to give a performance, not "under the bright lights of the stage," but "in front of the boundless golden grain," and in front of the "muddy-legs." He is said to have felt that his music "belonged to the 'muddy-legs,' belonged to the living grain he loved so well."³¹ The violin marks him unambiguously as an intellectual, but the contrast between the "big city" and the "desolate mountains," the "bright lights of the stage"

26 On this phenomenon more generally, see Sigrid Schmalzer, *The People's Peking Man:*

Popular Science and Human Identity in Twentieth-Century China (University of Chicago Press, 2008), 124-25.

27 Qi Shuying and Wei Xiaowen, *Yuan Longping zhuan*, 104.

28 Qi Shuying and Wei Xiaowen, *Yuan Longping zhuan*, 97.

29 Yao Kunlun, *Zoujin Yuan Longping* [Forward, Yuan Longping] (Shanghai: Shanghai kexue jishu chubanshe, 2002).

and the "muddy legs," recalls the classic Mao-era call for scientists to descend from the ivory towers and get dirty in the fields.

Conclusion

Hybrid rice is one of the most celebrated inventions of the Mao era, but the *story* of hybrid rice—and in particular the story of Yuan Longping—is a decidedly post-Mao phenomenon. In reconstructing the emergence of hybrid rice technology from Mao-era sources and contrasting those accounts with the story as it developed first under the brief Hua Guofeng regime and then in the postsocialist period, we see the tremendous changes in both the political economy and thus the political ideology of recent Chinese history. Hybrid rice developed within a research and extension system that downplayed the efforts of individual scientists and instead emphasized the collective labors of peasants, technicians, and scientists organized in a network of numerous, diverse institutions. The public first learned of hybrid rice during the Hua era, when it was said to symbolize both the correctness of the Maoist line and the wise stewardship of Hua Guofeng. However, once Deng Xiaoping took the helm, the story quickly adopted a strikingly different set of scientific values far more consistent with the standards of international, professional science. Yuan Longping became an isolated genius struggling mostly on his own to overcome the chaos and persecution of the Cultural Revolution. Still, the Mao era has left an important, if muted legacy in the valorization of Mao's philosophical writings, in the triumphalist celebration of Chinese victories over Western science, and in the continued enthusiasm for scientists who bridge the ivory tower with the honest mud of the Chinese countryside.

30 CCTV, "Women dou you yishuang shou" [We each have a pair of hands],

http://www.cctv.com/program/ddgr/20030627/100701_4.shtml (accessed 5 February 2014).

31 Qi Shuying and Wei Xiaowen, *Yuan Longping zhuan*, 193.