

# How a lack of research affects us all

With horticultural research in a state of crisis, **Jules Janick** maintains that the world's governments fail to support it at their – and society's – peril

**AESOP'S FABLE ABOUT THE GREEDY COUPLE** who killed their golden-egg-laying goose because they were not getting rich fast enough, has resonance with the world's approach to horticultural and agricultural research.

The international research system that has previously provided continued progress in the production of improved crops and cropping systems has been short-changed as governments look for short-term savings by starving, and sometimes killing, their golden-egg producer. Investments in the world's research system have been at best stagnant and at worst eliminated, with the assumption that the private economy would take up the slack. It has not. But what to do about it is the real challenge.

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## A wider view

We have lost sight of a truism: research is necessary in agriculture and food production just to stay even. Mother Nature, usually thought of as a warm and kindly lady, can be cruel and thoughtless. Consider climate change, floods, droughts, erosion and salinisation, as well as new diseases such as those affecting citrus and banana. These events, in combination with the surge in production of biofuels to counter ever-increasing oil prices, has resulted in substantial changes to agricultural practice. The result? Soaring prices for food, and a reduction in grain stocks that have previously provided world food security. Perhaps using food for fuel is not such a good idea after all.

While it is true that some governments had been generous in the support of basic research in biotechnology, the vast sums expended have not yet paid off in horticulture and most field crops (although herbicide- and insect-resistant soya bean, maize and cotton have been widely adopted). By now, I would have expected stress-resistant plants for our gardens and more nutritious foods for our supper table, but for a number of reasons they have not arrived.

Furthermore, organic foods, which have captured the imagination of many consumers as a welcome return to simpler times, cannot compete in the marketplace unless prices are high. The elimination of pesticides in commercial vegetable glasshouses by using biological control has

demonstrated that organic systems can work, but they require complex strategies that can only be obtained with a highly technical, coordinated, research-informed effort.

## Benefits for all?

For home gardeners, horticultural research is not a remote, academic activity – it has many tangible effects from which we all benefit. You may not think it, but whether it is vegetable seeds for 'growing your own', or container-grown stock you buy from a garden centre, research (in its many guises) has had a hand.

Take crop developments, for example. Remarkable changes in strawberry production have been obtained by the introduction of the everbearing, day-neutral gene; the production of chilled plants that allows them to be grown as an annual crop; plastic-cover technology to extend season length and, as a result, increased cropping; and breeding efforts that have created excellent-tasting, firm, attractive fruit (though some may argue that the mammoth fruit is overdone). Other improved crops that appeal to consumers include supersweet maize, sugarsnap peas and seedless watermelons. There is still much more to be done, however.

Horticulture has great potential to contribute to economic development, to improve diets and health, and to alleviate ever-demanding environmental problems. Green-roof technology is one example of what might be accomplished to save energy as well as beautify cities. A serious effort is needed to make lawns more environmentally friendly and reduce the weekly expense, and energy costs, of mowing. Home gardens require more disease- and pest-resistant plants, greater stress tolerance, self fruitfulness, longer flowering periods for ornamentals, greater hardiness, and dwarf growth habits (for smaller gardens and less maintenance). We must be sure that our introduced ornamentals will not become invasive pests that we may regret later. These goals require more research, not less.

## Calling for action

The public needs to be involved. A change in philosophy is required. The organic movement has to move away from being doctrinaire. We all agree that reducing dangerous pesticides is desirable, but we should stop thinking of organic systems as a dogma, with many useful horticultural practices considered sinful and forbidden. Tissue culture, exploitation of hybrids or grafting is not sinful; nor is inorganic fertiliser, when required.



TOM CAMPBELL, PURDUE UNIVERSITY

We all need a reverence for life, but I believe it is not selfish or immoral to think that diseases affecting our food or ornamental plants, as well as ourselves, need to be controlled. Sometimes medicine is needed. Effort must be imparted on both sides of the debate – whether it is governments financially and structurally supporting research, or researchers themselves. For example, my colleagues in biotechnology need to take time to get out of their laboratories and into gardens and fields to find new approaches and gene discoveries that make sense to consumers. One example, that would benefit consumers and manufacturers alike, would be new approaches to improve natural waxes that could do much to increase shelf life and disease resistance on certain produce.

We need to think of agricultural and horticultural research as a source of golden eggs. This requires that we treat the research goose with care: it deserves feeding, respect and reverence, from governments and industry all the way through to the public. Until then, it is in serious peril. ■

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#### CALLING FOR MORE RESEARCH

Horticultural scientist Jules Janick believes that without sustained and properly-funded research, the future of horticulture and agriculture stays in the balance – to our collective detriment

## A UK PERSPECTIVE: CALLING FOR A NEW RESEARCH AGENDA

The National Horticultural Forum was created in 2002 to give a vision for the development and promotion of horticulture in the UK, especially research and development. Its chairman is Andrew Colquhoun, former Director General of the RHS.

In autumn 2008 it published a report, 'A review of the provision of UK horticultural R&D', outlining the positive and negative situation affecting British horticultural research.

#### Clear signal

The report argues that a 'significant gap now exists in funding for basic and strategic research and development [R&D]', even though demand continues to exceed funding (with the Horticultural Development Company funding near-market research through industry levies).

Some of the key problems affecting British horticultural research include:

- a change in policies from the Department for Environment, Food and Rural Affairs in 2006, which now significantly affects the availability of research and development funding needed to address growers' present and future concerns;
- insufficient co-ordination between funders;
- many research and development facilities are ageing with uncertainty about future investment;
- a lack of succession planning, staff skills base and uncertainty in career opportunities.

The report also states that UK R&D could significantly help inform key public policy issues, such as climate change, environmental problems, health and wellbeing, and food security.

Strategic options for horticultural research and development include:

- interdisciplinary links with engineering, economic and social research, as well as plant and microbial science;
- interaction with fresh-produce supply chains, growers, co-operatives, distributors and retailers.

The report has been fed into wider industry discussions including the Horticultural Development Company's own research strategies.

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