



Breeding Commercial Hybrids in Pigeonpea



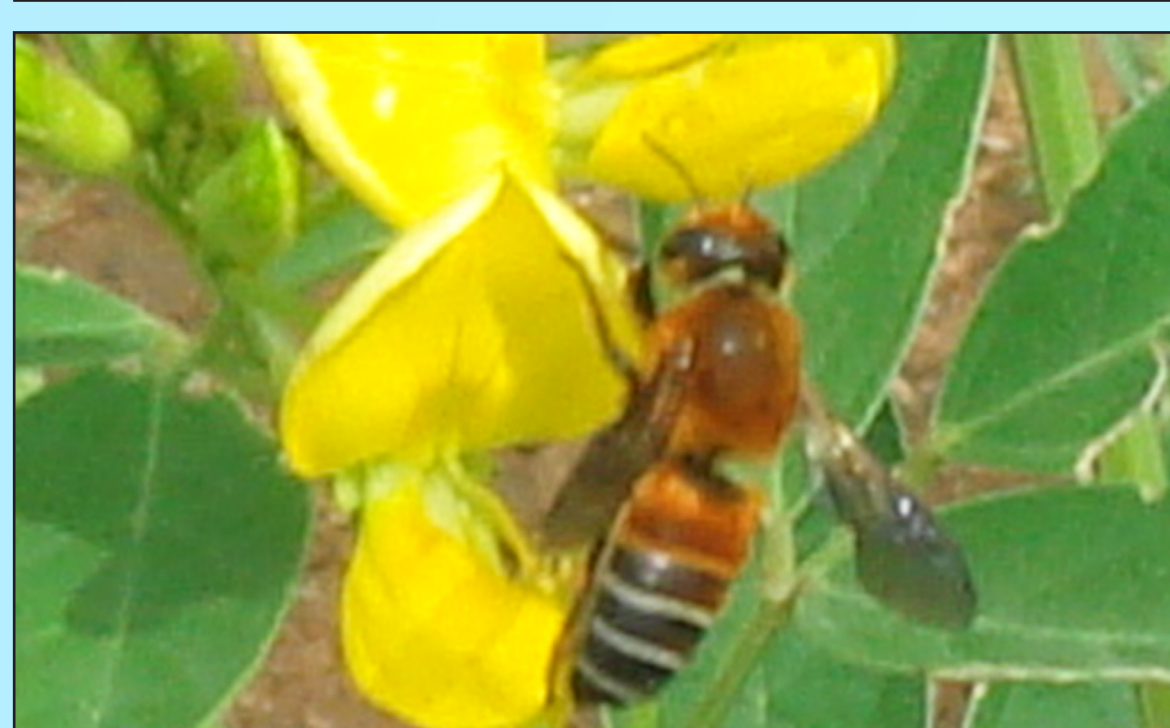
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- Pigeonpea [*Cajanus cajan* (L) Millsp.] is an important food legume of about 5 m ha of rainfed semi-arid tropical areas of Asia, Africa and the Caribbean. Its drought resistance, high protein (20 - 22%), and multiple uses (food, fodder, fuel) make it an ideal crop for small-holding poor farmers.



- In spite of continuous breeding efforts in the past 50 years, the productivity of pigeonpea has remained low (700 kg ha⁻¹) and the global production (3.5 m t) always falls short of ever-rising demand.



- Pigeonpea is a partially out-crossed species and for increasing its yield potential, ICRISAT scientists made use of its out breeding nature to develop a hybrid breeding technology, the first in any food legume.
- The first breakthrough in this technology was achieved when a cytoplasmic-nuclear male-sterility system (CMS) was developed by crossing *C. cajanifolius* (a wild species) and a cultivar line. This CMS system is stable across diverse environments and has an excellent fertility restoration system. These developments have set an ideal stage for the breeding of commercial hybrids in pigeonpea.
- The promising short-duration pigeonpea hybrids are ICPH 2433 (1714 kg ha⁻¹), ICPH 2438 (1269 kg ha⁻¹), and ICPH 2363 (985 kg ha⁻¹) and these hybrids respectively yielded 147%,83%, 42% superior over control UPAS 120 (695 kg ha⁻¹).
- The promising medium-duration hybrid of Maruti maturity group are ICPH 2671 (2373 kg ha⁻¹), ICPH 3341 (2740 kg ha⁻¹), ICPH 3467 (2667 kg ha⁻¹) and these hybrids gave respectively 23, 46 and 42% better yield than control Maruti.
- In Asha maturity group hybrid ICPH 4019 (2524 kg ha⁻¹), ICPH 4012 (2459 kg ha⁻¹), ICPH 4017 (2326 kg ha⁻¹), and exhibited respectively 42, 38, and 31% superior over control Asha (1777 kg ha⁻¹).

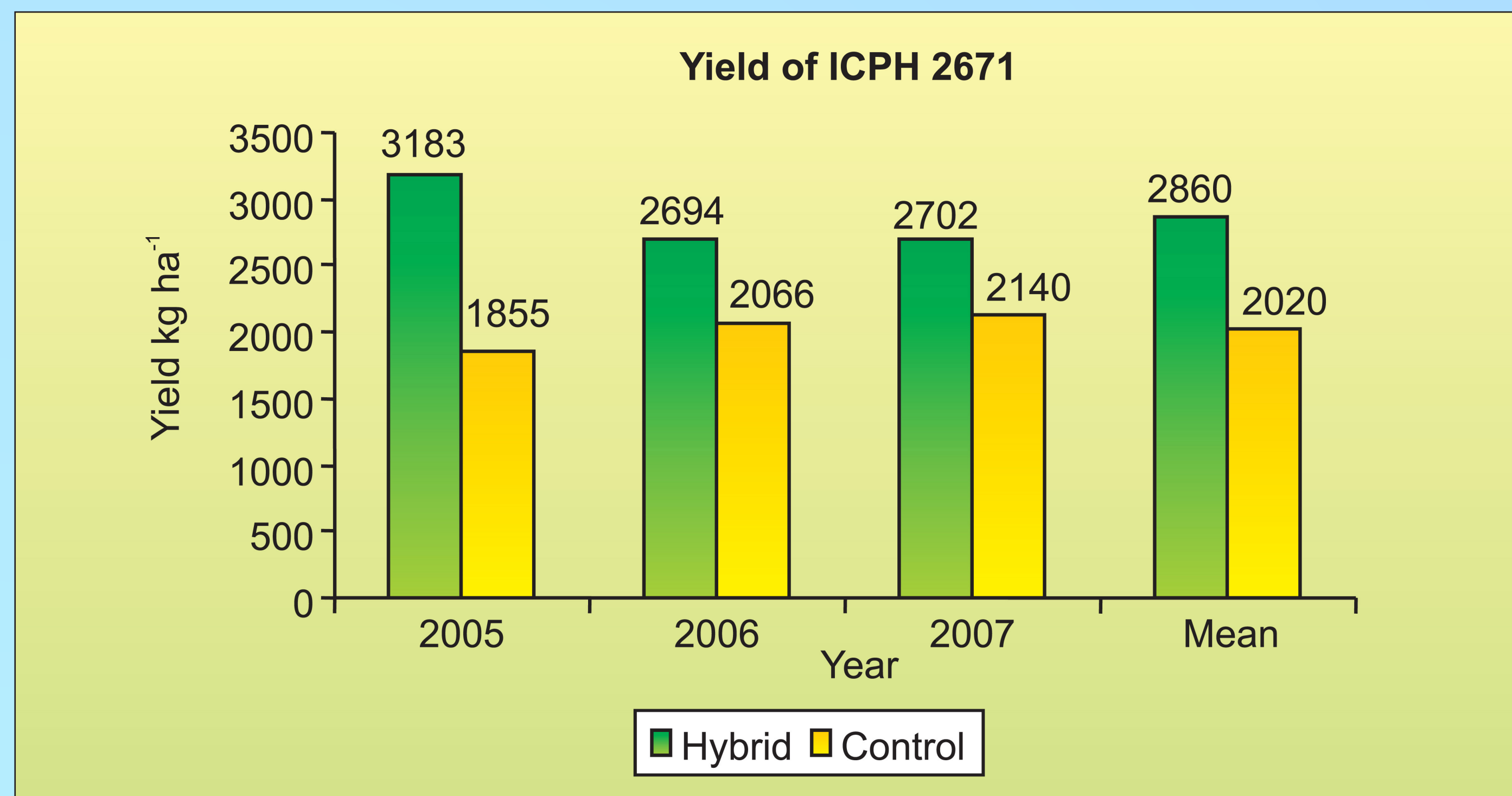
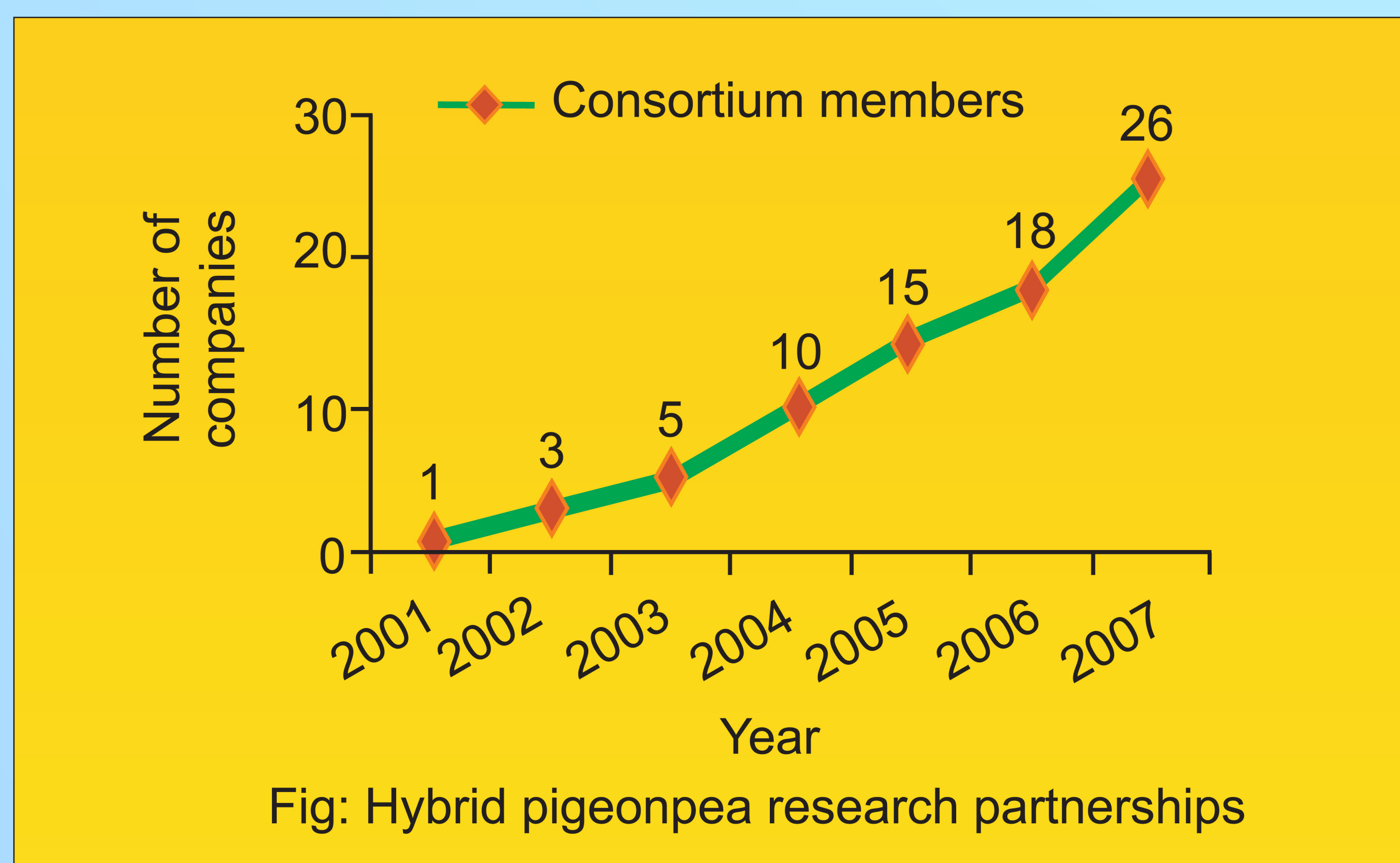


Table . Yield in on-farm demonstrations of ICPH 2671 in India, 2007				
Location	Number of trials	Yield (kg ha ⁻¹)		%increase over
		ICPH 2671	Maruti	
Pradham Bio-tech, Karnataka	1	1200	700	71.4
SFCI,BV Nagar, Nandyal	1	2500	1875	33.3
SFCI,Jawalgera, Raichur	1	650	350	85.7
Mahyco, Maharastra	13	1820	1588	14.6
Mahyco, Karnataka	6	1700	1570	8.3
Mahyco. Andhra Pradesh	5	2020	1710	18.1
Mahyco, Madhya Pradesh	2	2588	1925	34.4
Mean		1783	1388	28.5

- A technology for large-scale seed production of hybrids and their parents was perfected at ICRISAT. In well managed fields, commercial yields of over 1000 kg ha⁻¹ are recorded and this has encouraged commercial seed producers.
- The experimental pigeonpea hybrids have shown significant hybrid vigor. Of these, ICPH 2671, a disease resistant hybrid, is the most outstanding.
- In multilocation trials as well as on-farm trials, ICPH 2671 has recorded significant advantages over the control varieties.
- The transfer of technology is being done in partnership mode. At present, we are working with 22 private seed companies and NARS.
- In 2007, over 39 t of hybrid seed of ICPH 2671 was produced by seed companies.
- In 2008, the first commercial crop of the world's first pigeonpea hybrid will be grown on over 10,000 ha and it is likely to benefit about 2000-2500 farmer families.

Table. A record of seed production of hybrid ICPH 2671 in India			
District	Area (ha)	Yield (kg)	Productivity (kg ha ⁻¹)
Indore	0.15	340	2267
Nizamabad	0.40	700	1750
Warangal	1.20	1275	1063
Ahmadabad	0.80	850	1063
Medak	0.40	500	1250
Ranga Reddy	2.70	2756	1021
Nandyal	2.60	2000	769
Kurnool	2.80	2000	714
West Godavari	4.00	2646	662
Total/mean	15.10	13067	1173.2

