

# Gy 4 Cucumber Inbred and 'Raleigh' Hybrid Pickling Cucumber

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Gy 4 is a multiple disease-resistant, gynoeocious cucumber (*Cucumis sativus* L.) inbred. It has high combining ability for either once-over or multiple harvest yield producing high-yielding hybrids when crossed to monoecious inbred lines. In addition, it has a high level of resistance to anthracnose (*Colletotrichum orbiculare*) and angular leafspot (*Pseudomonas syringae* pv. *lachrymans*) under Wisconsin and North Carolina field conditions, including the recently identified virulent strain of *Colletotrichum* found in central Wisconsin (personal communication, M.J. Palmer).

Gy 4 has proved its value in hybrid combination with the monoecious inbred, NCSU M 21, and we have named the hybrid 'Raleigh'. 'Raleigh' pickling cucumber had 12% more yield (\$/ha in six harvests) than 'Calypso', the major cultivar in North Carolina (Table 1). It also had 26% more early yield (\$/ha in the first two harvests of a six-harvest trial) than 'Calypso'. Fruit quality (shape, color, and seed cell size), length : diameter (L : D) ratio, firmness, and bloater resistance were similar to 'Calypso'. 'Raleigh' was

similar in yield to 'Regal' but offers improved anthracnose resistance and fruit quality and a smaller L : D ratio. Under Wisconsin conditions, 'Raleigh' was competitive with

standard cultivars for yield (Table 2) and had processing quality equal to 'Calypso' (data not shown).

## Origin

Gy 4 originated from the cross of the multiple disease-resistant gynoeocious inbred Gy 14 with the high-yielding, high fruit quality monoecious inbred NCSU 19D4 (Fig. 1). Segregating populations were tested for disease resistance in the seedling stage, and for yield, earliness, quality, gynoeocious expression, bloater resistance, and disease resistance in the field. Lines inbred to the F<sub>3</sub> (NCSU) and F<sub>13</sub> (UW) were tested for disease resistance and gynoeocious expression before being selected for final increase in isolated field plantings.

Table 1. Performance of 'Raleigh' hybrid (Gy 4 × M 21) compared with a set of standard pickling cucumber cultivars for the southeastern United States.<sup>2</sup>

Cultivar	Yield (\$/ha)	Earliness (\$/ha)	Quality 1-9	Anthracnose 0-9	Firmness (kg)	L : D ratio	Balloon (%)
Raleigh	4850	2060	6.0	3.5	8.6	3.1	2
Explorer	3710	1380	6.2	4.4	9.1	2.9	4
Carolina	3980	1590	6.3	4.8	9.1	3.0	5
Calypso	4310	1640	6.3	3.8	9.1	3.1	3
Regal	4960	1740	5.6	4.4	8.2	3.2	3
LSD (5%)	519	393	1.0	0.9	0.5	0.1	2

<sup>2</sup>Data are means over 3 years (1983, 1984, 1985), two seasons (spring, summer), and three replications. Yield data are summed over six harvests. Dollar values based on North Carolina processor prices for grades one through four. Earliness is the value of the fruits from harvests one and two. For quality, 1 = poor, 9 = excellent; for anthracnose, 0 = no disease, 9 = plant dead. Firmness is the force required to punch a hole in 45-mm-diameter fruits (10-fruit samples) with a Magness-Taylor tester having an 8-mm tip. L : D is the length : diameter ratio of 35-mm-diameter fruits (10-fruit samples). Balloon is the percentage of the fruit tissue damaged by balloon bloating in a brine tank purged with 100% CO<sub>2</sub> gas.

Table 2. Performance of 'Raleigh' hybrid (Gy 4 × M 21) compared with a set of standard pickling cucumber cultivars in 1983 through 1986 in Wisconsin.<sup>2</sup>

Cultivar	1983			1984			1986		
	Fruits/plant	Yield (Mt-ha <sup>-1</sup> )	L : D	Fruits/plant	Yield (Mt-ha <sup>-1</sup> )	L : D	Fruits/plant	Yield (Mt-ha <sup>-1</sup> )	L : D
Raleigh	6.8	40.9	2.7	6.0	43.2	2.5	4.3	26.0	3.2
Calypso	5.6	43.0	2.9	5.0	36.6	2.7	4.1	22.7	3.1
Regal	8.1	43.0	2.9	6.4	44.3	2.6	4.1	27.3	3.3
Calico	5.1	40.8	2.9	5.8	37.6	2.6	3.8	19.3	3.0
LSD (5%)	1.9	6.6	---	---	---	---	0.7	4.9	---

<sup>2</sup>Data are for three harvests in 1983 and 1984 and two harvests in 1986. L : D is the length : diameter ratio of 35-mm-diameter fruits (fresh in 1983, 1984 and brinestock in 1986; 10-fruit samples).

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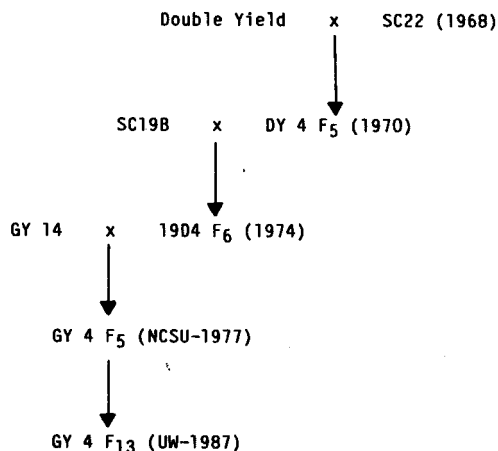


Fig. 1. History of breeding and development of Gy 4.

Table 3. Diseases for which Gy 4 has been evaluated in field and greenhouse tests.

Pathogen	Common name	Test <sup>a</sup>	Reaction <sup>b</sup>
<i>Cladosporium cucumerinum</i> Ell. & Arth.	Scab (spot rot)	GH + F	R
Cucumber mosaic virus	CMV	GH + F	M
<i>Pseudomonas syringae</i> pv. <i>lachrymans</i> (Smith & Bryan) Young et al.	Angular leafspot	GH	R
<i>Colletotrichum orbiculare</i> (Berk. & Mont.) von Arx	Anthrachnose	GH + F	R
<i>Pseudoperonospora cubensis</i> (Berk. & Curt.) Rostow	Downy mildew	GH + F	R
<i>Sphaerotheca fuliginea</i> (Schlecht.: Fr.) Poll.	Powdery mildew	GH	R
<i>Fusarium oxysporum</i> (Schlecht.) Snyd. & Hans f. sp. <i>cucumerinum</i> Owen	Fusarium wilt		R
<i>Didymella bryoniae</i> (Auersw.) Rehm	Gummy stem blight	F	I
<i>Rhizoctonia solani</i> Kuhn	Belly rot	F	I

<sup>a</sup>Tests were on mature plants in the field (F), or on seedlings in the greenhouse (GH).

<sup>b</sup>Host reaction was resistant (R), moderately resistant (M), or intermediate (I).

### Description

**Vines.** Gy 4 has moderate size, medium-green vines with an indeterminate, branched plant type or habit. Leaves are medium size. Vine growth is less than Gy 14 under hot, humid conditions common to the spring and summer production seasons of the southeastern United States and in the more temperate midwest production areas.

**Flowering habit.** The plants are gynoeious, nonparthenocarpic, and reach 50% flowering when plants are ≈30 days old (when grown under controlled 30/20C day/night conditions). Flowering is sequential and usually begins at the first node.

**Fruits.** Gy 4 is a pickling cucumber with short, dark-green fruits and white spines (Fig. 2). The fruits are coarse-spined (moderately warded), and have a slight speckling and striping (not uniform green), as is typical of American pickling cucumbers. Gy 4 has a L: D ratio of ≈2.8 for 35-mm-diameter fruits.

**Resistance.** Gy 4 has field resistance to seven diseases common in the United States (Table 3): scab, cucumber mosaic virus, downy mildew, powdery mildew, anthracnose, angular leaf spot, and fusarium wilt. It has moderate tolerance to gummy stem blight and *Rhizoctonia* fruit rot. Gy 4 is susceptible to or untested for reaction to target leaf spot, bacterial wilt, zucchini yellows mosaic virus, and watermelon mosaic virus.

**Seeds.** Mature seeds of Gy 4 are smaller

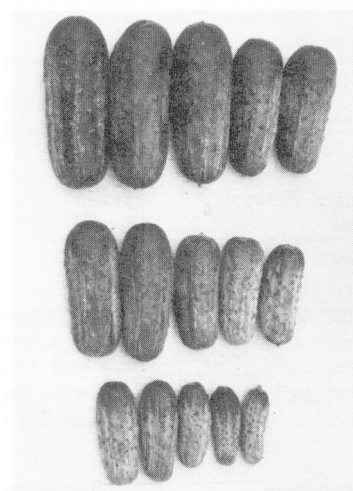


Fig. 2. Typical fruits of Gy 4 pickling cucumber inbred.

than those of Gy 14 (produced in North Carolina or Wisconsin), although germination is similar in the two lines.

### Availability

Small amounts of breeder seed may be obtained from R.L.L.