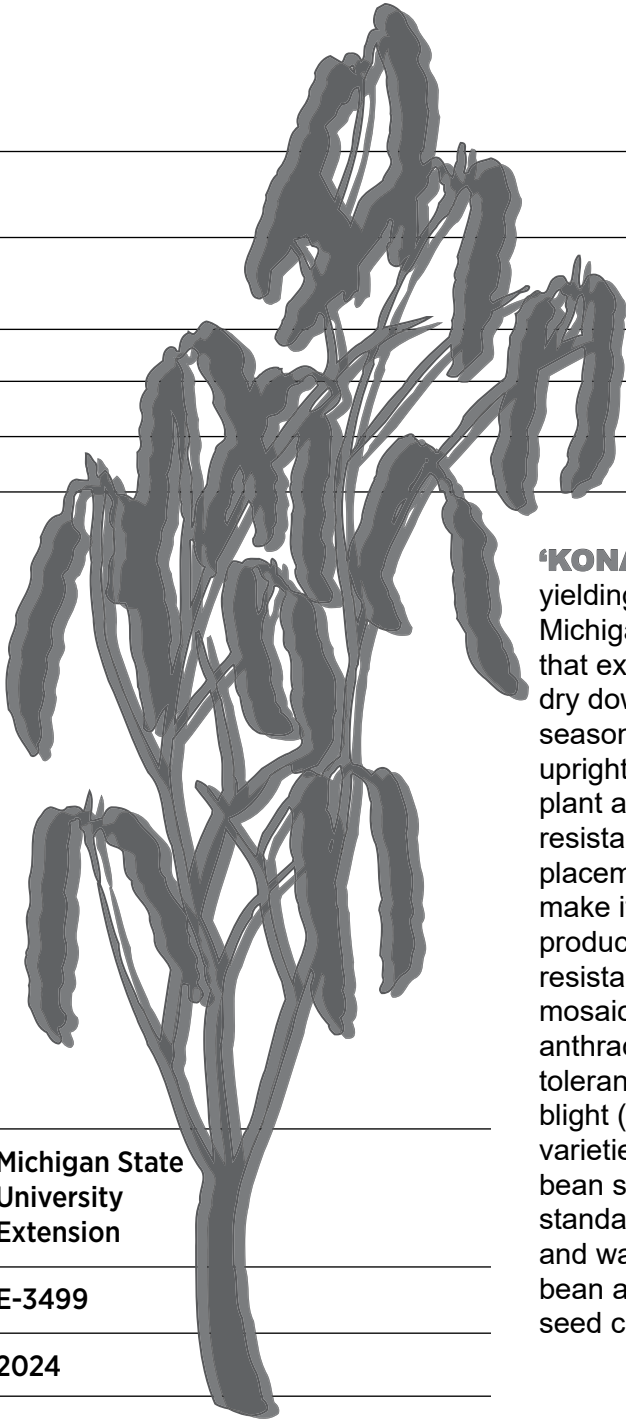


# NEW from MSU

# 'KONA'

A New Bean Variety

for Michigan



- New upright full season black bean variety suited for direct harvest.
- Top-yielding black bean in statewide trials, averaged 32 cwt/acre across 24 locations.
- Good tolerance to white mold.
- Tolerant to common bacterial blight.
- Exhibits uniform maturity and dry down.

**'KONA'** is a new upright, high-yielding, black bean variety from Michigan State University (MSU) that exhibits high yield and good dry down at maturity. This full season maturing variety has an upright, short vine growth habit. The plant architecture, combined with resistance to lodging and high pod placement within the plant canopy make it suitable for direct harvest production systems. 'Kona' is resistant to strains of bean common mosaic virus (BCMV), race 7 of anthracnose and has shown better tolerance to common bacterial blight (CBB) than other black bean varieties. 'Kona' produces a black bean seed that meets industry standards for export and packaging and was rated average in canned bean appearance in the black bean seed class.

## Origin and Breeding History

'Kona', tested as MSU black bean breeding line B20536, was developed from the cross between two MSU black bean breeding lines B15430/B16504. B15430 was a black bean derived from the cross: 'Zenith'/B12721 that exhibited an upright plant habit, good yield performance and efficient dry down. B16504 was derived from the cross 'Zenith'/'Alpena'\*/B09197 that exhibited exceptional yield potential. The pedigree breeding method was used to advance the cross to the F4 generation followed by pure line selection for disease, agronomic and quality traits.

## Agronomic and Disease Information

'Kona' exhibits the Type-IIa upright indeterminate short vine growth habit combined with good resistance to

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E-3499

2024

lodging (1.7 on scale 1 to 5, Table 1). 'Kona' is as erect as 'Black Pearl', and 'Zenith', but generally more upright than the other black varieties tested. Plants averaged 19 inches in height similar to the other varieties. Kona is a full-season bean, flowering in 48 days and maturing in 97 days after planting. The range in maturity is from 89-102 days depending on the season and location. Maturity was not significantly different than 'Black Pearl', 'Zenith', and 'Black Beard', but was significantly earlier than 'Black Bear' (4 days), 'Nimbus' (3 days) and 'Spectre' (5 days). Kona has a high agronomic acceptance rating (5.1, Table 1) due to its upright habit, resistance to lodging, uniform dry down and favorable high pod placement in the plant canopy.

'Kona' has been tested for four years (2020-2023) in 24 locations by MSU researchers in Michigan as well as colleagues in Washington, and Nebraska, where it appears broadly adapted. The combined yield data comparisons are shown in Table 1. Over 24 locations, 'Kona' yielded 32.2 hundredweight per acre (cwt/acre), which was above the average test means of 29.1 cwt/acre. It outyielded all other black bean varieties by different margins; 'Zenith' (6%), 'Black Beard' (8%), 'Black Bear' (5%), 'Nimbus' (8%), 'Spectre' (3%) and 'Black Pearl' (8%). Yield ranged from a high of 46.5 cwt/acre under ideal growing conditions in Huron County in 2023 (despite severe white mold pressure) to a low of 24.1 cwt/acre under excessive rainfall and water damage in Tuscola County in 2023. Additional testing was conducted under drought at Othello, WA in 2022-23 where 'Kona' produced yields of 43.5 and 53.7 cwt/acre, respectively under well-watered conditions while yields

under drought stress were 28.9 and 41.2 cwt/acre. Similar performance was observed at Scottsbluff, NE in 2022 where it appears well adapted with yields in the well-watered treatment of 49.3 cwt/acre and 12.8 cwt/acre under severe drought stress. These yields are not included in Table 1 averages as no commercial black bean cultivars were tested in these trials limiting direct comparisons. 'Kona' appears well adapted across a range of environmental conditions and is well suited to the narrow row, direct harvest management system commonly used in Michigan. Growers should follow current recommended practices for fertility and weed control in growing this variety. Recommendations can be found online at the SVREC site (<https://www.canr.msu.edu/saginawvalley/>) and at MSU Weed Science ([canr.msu.edu/weeds/](http://canr.msu.edu/weeds/)).

'Kona' possesses the single dominant I gene, which confers resistance to seed-borne BCMV. All the black bean varieties listed in Table 1 possess the same resistance gene. 'Kona' is resistant to anthracnose race 7 but is susceptible to race 73. 'Kona' had the lowest CBB ratings (1.2) among all black bean cultivars in breeding trials at SVREC. Less foliar symptoms were observed on 'Kona' under natural infection field conditions compared to 'Black Pearl', 'Black Beard' and 'Nimbus'. 'Kona' exhibited moderate tolerance (47%) in white mold trials designed to promote disease development. White mold infection was not significantly different than 'Zenith' (43%), 'Black Bear' (59%), or 'Nimbus' (52%), but 'Black Pearl' (72%), and 'Black Beard' (72%) were more susceptible, while 'Spectre' (25%) was more tolerant. This data represents

an average of two years of irrigated trials at Montcalm, and three years of on-farm trials in Huron County, where white mold routinely impacts bean production.

### **Quality Characteristics**

'Kona' has a larger black bean seed size, averaging 2,010 seeds/pound and seed size range from 1,890 to 2,110 seeds/pound over years and locations (Table 1). The seed is similar in size to 'Zenith' and 'Black Beard', larger in size than 'Black Bear' (2,250 seeds/pound) and smaller compared to 'Nimbus' (1,930 seeds/pound). Dark black canned bean color is important to the canning trade, and several widely grown newer varieties suffer from inferior color retention, which has become a concern to the industry in recent years. In canning trials, 'Kona' was rated by a team of panelists as being average in color retention following canning, scoring 3.3 on a scale of 1 = very undesirable to 5 = very desirable. Therefore, 'Kona' was rated slightly above average and acceptable to canners.

### **Release and Research Fee**

'Kona' was released by Michigan State University with the option that 'Kona' be sold for seed by variety name only as a class of certified seed under the three-class system used in Michigan (breeder, foundation, certified). A royalty will be assessed on each hundred-weight unit of either foundation seed or certified seed sold. Plant Variety Protection (PVP) from the USDA Agricultural Marketing Service is anticipated. Parties interested in licensing 'Kona' may contact MSU Technologies (<http://technologies.msu.edu>) by phone at 517-355-2186 or by e-mail at [msut@msu.edu](mailto:msut@msu.edu).

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## Suggested Citation

Wright, E. M., Kelly, J. D., Awale, H. E., Bales, S., Chilvers, M. I., & Sprague, C. L. (2024). *'Kona': A new black bean variety for Michigan* [E3499]. East Lansing: Michigan State University, MSU Extension.

**Table 1. Comparison of yield, agronomic, disease and canning characteristics of 'Kona' with six other black bean varieties over 4 years and 24 locations testing (2020-2023) in Michigan.**

Traits	Varieties						
	'Kona'	'Zenith'	'Black Beard'	'Black Bear'	'Nimbus'	'Spectre'	'Black Pearl'
<b>Agronomic traits</b>							
Days to flower	48	47	47	45	49	50	47
Days to maturity	97	97	98	101	100	102	98
Height in inches	19	17	20	18	19	18	18
Lodging score <sup>a</sup> (1–5)	1.7	1.7	2.3	2.2	2.2	2.2	1.8
Agronomic index <sup>b</sup> (1–7)	5.1	4.7	3.9	3.5	3.7	4.0	4.4
Seeds/pound	2010	2000	2000	2250	1930	1990	2070
Mean yield <sup>c</sup> (cwt/acre)	32.2	30.2	29.6	30.5	29.6	31.3	29.6
Yield percentage	100	94	92	95	92	97	92
<b>Disease resistance traits</b>							
BCMV <sup>d,e</sup>	R	R	R	R	R	R	R
Anthracnose Race 7	R	R	S	S	R	--	R
Anthracnose Race 73	S	R	S	R	S	S	R
CBB rating (1-5) <sup>f</sup>	1.2	1.7	3.5	--	2.6	--	2.3
White Mold (%) <sup>g</sup>	47	43	72	59	52	25	72
<b>Canning traits</b>							
Visual Appearance (1-5) <sup>h</sup>	3.2	3.6	3.8	2.9	2.6	2.7	2.9
Color rating <sup>h</sup> (1-5)	3.3	4.3	4.1	2.1	2.3	2.9	4.6

<sup>a</sup> Lodging: 1 = Erect, 5 = Prostrate

<sup>b</sup> Agronomic index: 1 = Worst, 7 = Excellent in appearance and dry down

<sup>c</sup> Yield was averaged over 24 locations from 2020 to 2023

<sup>d</sup> Diseases: R = Resistant, S = Susceptible

<sup>e</sup> BCMV = Bean Common Mosaic Virus

<sup>f</sup> CBB = Common Bacterial Blight, 1= Resistant, 5 = Susceptible

<sup>g</sup> White mold = % disease incidence

<sup>h</sup> Visual and color rating: 1 = Very undesirable, 3 = Average, 5 = Very desirable