Small Fruit Berry Crops:
Production and marketing overview and Environmental Horticulture Implications

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Small fruit "Berry" crops

- Blueberry
- Blackberry
- Raspberry
Blueberry nutraceutical value

BLUEBERRIES
A Handful of Health

Plump, juicy, and sweet, with vibrant colors ranging from deep purple-blue to blue-black and highlighted by a silvery sheen called a bloom, blueberries are one of nature's great treasures. Though miniature in size, they are also proof that, when it comes to health benefits, good things really do come in small packages.

BLUEBERRIES ARE...

LOW IN FAT.
A one-cup serving contains only 80 calories and virtually no fat.

FULL OF DIETARY FIBER.
A handful of blueberries helps satisfy recommended daily fiber intake. Fiber helps keep the body regular, the heart healthy, and cholesterol in check.

FULL OF PHYTONUTRIENTS.
Research suggests that the phytonutrients in blueberries, called polyphenols, have antioxidant and anti-inflammatory properties that may help keep the inflammatory process associated with chronic conditions such as cardiovascular disease, cancer, and other age-related diseases.

PACKED WITH VITAMIN C.
One serving delivers almost 25% of one's daily requirement of vitamin C.

AN EXCELLENT SOURCE OF MANGANESE.
Manganese plays an important role in bone development and in converting proteins, carbohydrates, and fats into energy.
NORTH AMERICAN BLUEBERRY CONSUMPTION

With blueberry production increasing to match rising levels of consumption, it’s clear that more Americans are discovering just how good these Little Blue Dynamos are.

Year | Total
---|---
1995 | 283 million lbs.
2000 | 349 million lbs.
2005 | 414 million lbs.
2010 | 749 million lbs.
2011 | 853 million lbs.

Per Capita
- 1995: 15.5 oz.
- 2000: 17.8 oz.
- 2005: 20.2 oz.
- 2010: 34.9 oz.
- 2011: 39.5 oz.
U.S. Sales of Small Fruits - 2008

- Strawberry: 57.2%
- Blueberry: 24.7%
- Raspberry: 11.1%
- Blackberry: 5.5%
- Other: 1.4%
Consumer demand for small fruits - US

Subcategory Contribution to Total Berries
2004 vs 2008

Blackberries: 4.0% 2004, 5.5% 2008
Blueberries: 20.9% 2004, 24.7% 2008
Currants: 0.1% 2004, 0.0% 2008
Other Berries: 1.7% 2004, 1.4% 2008
Raspberries: 63.8% 2004, 57.2% 2008
Strawberries: 5.4% 2004, 6.5% 2008

(source: FreshFacts- www.perishablesgroup.com)
Environmental factors affecting production

- Temperature
- Moisture vs relative humidity
- Wind
- Soil environment
- Day length
- Frost threat
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Climates dictate environmental conditions

• Macroclimate
  geographic positions > marine vs continental
  latitude
  altitude

• Microclimate
  plant canopy
  soil surface
  soil environment
Macroclimates
Macroclimates
Macroclimates

Köppen Climate Classification

Individual Climatic Zones Classified by Type

Type A
Tropical humid
Af, Am
Aw

Type B
Dry
BSk, BSh
BWh, BWk

Type C
Humid subtropical
Cf
Cfa
Cwa, Cwb

Type C
Mediterranean
Cs, Csa, Csb

Type C
Marine west coast
Cfb, Cfc

Type D
Humid continental
Dfa
Dfb
Dfc

Type E, H
Continental subarctic
Dfc
Dfd
Dwc
Dwd

Polar
ET-Tundra
EF-Snow and ice
Highland
H

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Macroclimates

World map of Köppen-Geiger climate classification

DATA SOURCE: GHCN v2.0 station data
Temperature (N = 4,644) and Precipitation (N = 12,396)

PERIOD OF RECORD: All available
MIN LENGTH: ≥30 for each month.

RESOLUTION: 0.1 degree lat/long

Contact: Murray C. Peel (mpeel@unimelb.edu.au) for further information
Macroclimates

Koppen uses:

- Native vegetation
- Temperature
- Precipitation - seasonality
Microclimates – strawberries / vegetables
Small fruit berry crops

- Small perennial shrubs or vines
Berry crop environments
Berry crop environments

- Temperature
- Moisture VS. relative humidity
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+ latitude, proximity to markets, labor, infrastructure?
• Overall adaptation VS problems
• Frost, freeze threat
• Heat unit accumulation; timing
• Night VS day
• Soil temperature
• Fruit quality VS vegetative growth
Production AND Fruit Quality
Moisture VS relative humidity

- **Rainfall**
  - soil moisture
  - dust, mites, whitefly

- **Relative humidity**
  - disease incidence
  - fruit quality
Wind

- **Moisture loss**
  - evapotranspiration (ET)
  - irrigation management

- **Physical effects**
  - cane breakage
  - fruit scarring
  - sand, soil abrasion
  - manage protected structures
Environmental factors

- Temperature
- Moisture VS relative humidity
- Wind
- Soil environment
- Freeze threat
Soil environments

- Physical properties
- Chemical properties
- Biological properties
Soil environment

- **Moisture**
  - soil water and plant availability
  - aeration
  - electrical conductivity

- **Nutrient availability**

- **Soil forming factors**
Frost threat

- Short-term losses
  - flower, fruit abortion
  - fruit damage
  - loss of market, production, price

- Plant little affected

- Protection
  - irrigation $\sim 3-4^\circ F.$
  - wind machines $> air mixing$ $\sim 2-3^\circ F.$
Environmental factors affecting production

- Temperature
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Small fruit berry crops

- Small perennial shrubs or vines
• **Small perennial shrubs or vines.**

• **Share many production and marketing characteristics with strawberry.**

• **Historically cultivated in temperate cold areas.**
  > now also into subtropical areas of US,
  - Florida, California

also Spain, Portugal, Morocco and highland tropics in Mexico and Central America
Grown in open fields or "protected"
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Organic Berry Production

• Growing demand in North American, Europe, Asia > more specialized market with premium prices

• Higher costs of production and more demanding management > specialized skills and special research needs

• Very different soil environment – nutrient availability

• Very different pest management regimes - managing weeds, insect pests are more challenging
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