

Brambles Workshop

‘Blackberry’

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UKREC

Princeton, KY



Joe Masabni

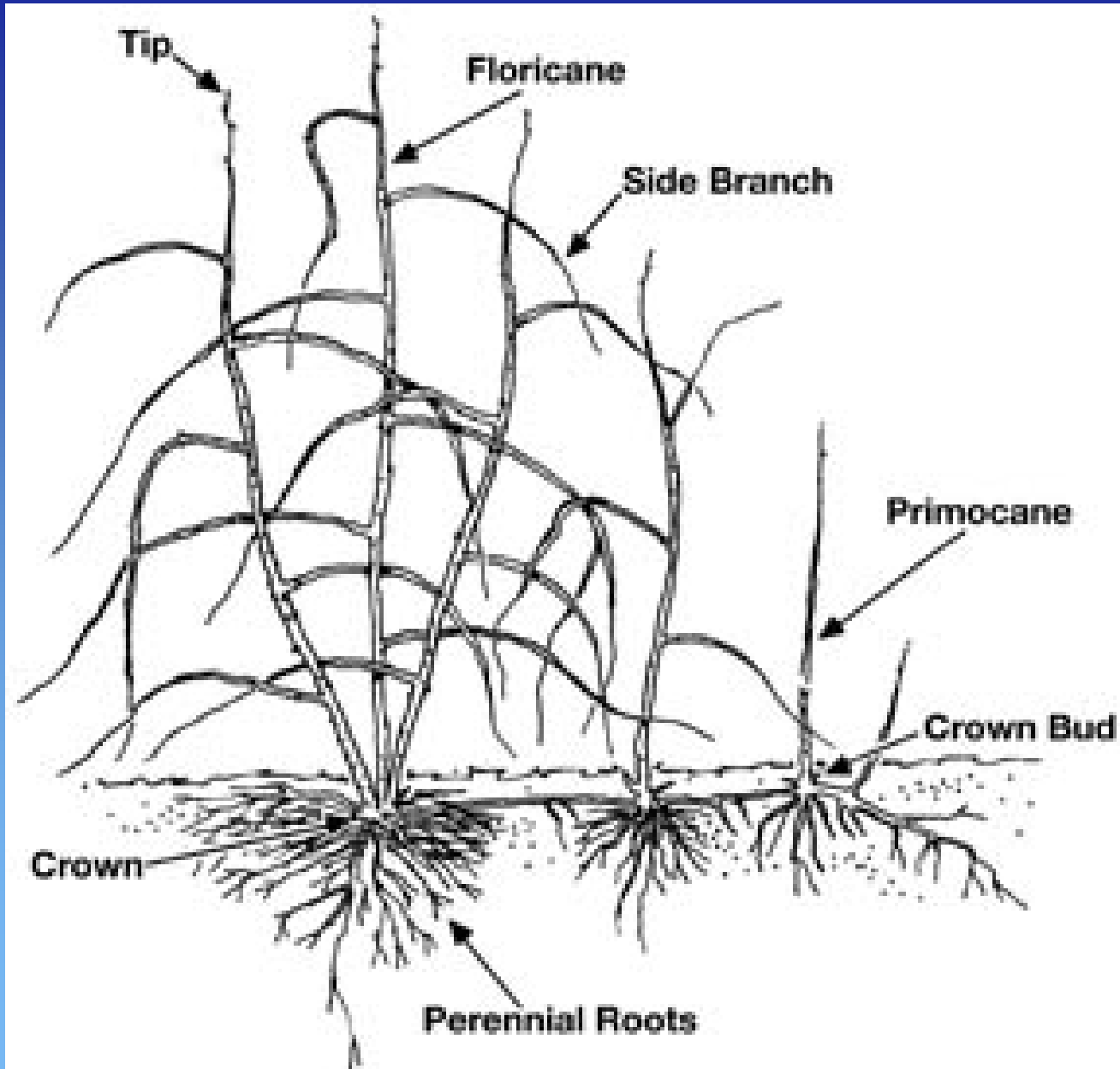
Become Familiar with

- Types
- Cultivars
- Training
- Pruning
- Yield
- Cost of operation
- Weed control

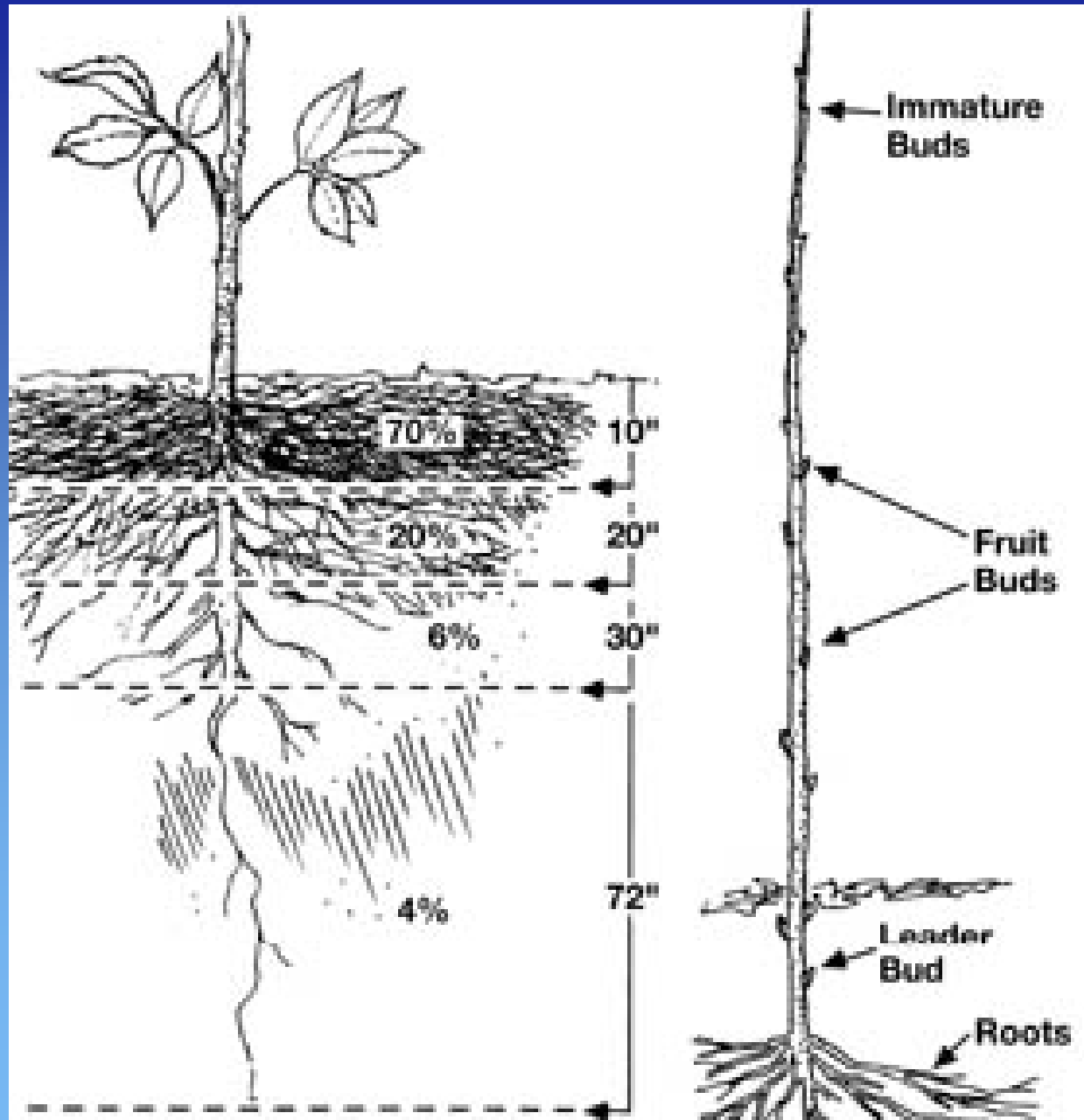
Must know

- Canes last for two seasons only.
- Primocane – The first year shoot or cane on a bramble (raspberry or blackberry).
- Floricane – A flowering and fruiting cane of a bramble the season after it was produced.

Terminology



Root Distribution and Nomenclature



Types

- Erect Thorny
 - Erect Thornless
 - Semi-erect Thornless
 - Primocane Fruiting, Thorny (new)
 - Trailing (Not Hardy for KY)
- } Floricane
Fruiting

Erect Thorny Blackberry Characteristics

- Trellis not required
- Hardest varieties winter injured at about -17 F
- First berries to be harvested
- Fruit are sweet
- Seeds are smallest
- Most growers and pickers do not want to deal with the thorns

Erect Thornless Blackberry

Characteristics

- Trellis may or may not be needed
- Winter injured at about -10 F
- Second in sequence to be harvested
- Berry sweetness is as good or better than that of thorny varieties
- Seeds are larger than those of erect thorny varieties.
- Generally have the lowest production of the blackberry types.

Semi-erect Thornless Blackberry

Characteristics

- Trellis required
- Winter injured at about -10 F
- Third in the berry harvest sequence
- Fruit are generally tart until very ripe
- Berries and seeds are large
- Most productive varieties.

Summary

	Harvest	Seed Size	Hardiness	Other
Erect Thorny	1 st	Smallest	-17 F	Sweet
Erect Thornless	2 nd	Larger	-10 F	As sweet
Semi-Erect Thornless	3 rd	Larger Yet	-10 F	Highest Yields



Primocane-Fruiting Thorny Blackberry Characteristics

Dr. John Clark, U. of AR

- Performance variable, dependent on location
 - In Aug. and early Sept., 5 days of 85 F or more reduces yield, fruit size and quality.
 - No understanding of hardiness, survived 10 F
- Recommended for home gardeners now and for very limited commercial trial
- Fruits are 2-10 g
- Fruits do not have the shipping characteristics of the thornless erect blackberries.
- Plants produced into November in Arkansas with the 2003 mild fall.



Primocane-Fruiting Thorny Blackberry Characteristics

- N recommendations about the same as for other blackberries, but benefit from a mid-summer N application following floricanes harvest
- A limited one year study showed equal yields for floricanes + primocane harvest compared with primocane harvest only.
- Plants will be available in 2004
 - For a list of licensed propagators go to:
www.uaex.edu, Agriculture, Horticulture, Fruits, Blackberries
- Considerably improved thorny and thornless varieties will be available in the next 4-6 years.



Become Familiar with

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- Erect Thorny
 - Chesapeake
 - Kiowa
- Erect Thornless
 - Arapaho
 - Apache
 - Ouachita
- Semi-erect Thornless
 - Triple Crown
 - Chester
 - Hull Thornless
- Primocane Fruiting, Thorny
 - APF 8
 - APF 12
- Trailing (not hardy)
 - Boysen
 - Marion



Chesapeake Erect Thorny

- Released 2000
- Very large fruit (over 15 g = 0.5 oz)
- Large drupelets
- Ripens mid to late season
- Moderately firm, very juicy
- Flavor excellent, leaving a light cool sensation on the palate with a hint of blueberries
- Vigorous productive canes
- Probably susceptible to orange rust



Arapaho Erect Thornless

- First Thornless erect to ripen, 2 weeks earlier than Navaho
- Fruit size slightly smaller than Navaho
- Fairly small seed size
- Very good flavor and stores well
- Lowest yielding of erect thornless varieties
- Lower vigor plant
- Tolerant to rosette, some resistance to orange rust



Apache Erect Thornless

- Ripens after Ouachita
- Very attractive, largest thornless erect berry, 8-10 g, size remains large all season
- No sterile drupelets
- Very good flavor and sweetness, 9.8% SS
- Stores well
- Highest yielding of erect thornless varieties
- Vigorous plant
- Problem with white drupelets
- No orange rust observed



Ouachita Erect Thornless

- Earlier than Apache with similar hardiness
- Attractive 6-7g berry
- Excellent flavor, 10+% SS
- Excellent yields, 4,919 lb/A avg. (02-03)
- Good post harvest handling
- Vigorous plant
- Resistant to rosette, no orange rust reported



Triple Crown Semi-erect Thornless

- Ripens with or slightly after Hull thornless
- Attractive, largest thornless semi-erect berry, 7.8 g
- Very good sweet aromatic flavor with pleasant aftertaste, 10.7% SS
- Lower yields than Chester and Hull
- Berries firm, but do not hold up as well as Chester and Hull
- Resistant to rosette, orange rust, and Phytophthora



Chester Semi-erect Thornless

- Latest semi-erect thornless to ripen, 10 days after Hull
- Attractive, second largest semi-erect thornless berry
- Berries tart, large seeds, 6g
Highest yields of semi-erect thornless varieties
- Berries firm, and hold up fairly well
- Resistant to rosette and orange rust, most resistant to cane blight, susceptible to *Phytophthora*



Hull Semi-erect Thornless

- First Thornless Semi-erect to ripen
- Smaller berry, 6 g
- Fairly tart until very ripe
- Yields more than Triple Crown
- Berries firm, and hold up better than Triple Crown
- Plants vigorous and survive well in Kentucky
- Resistant to rosette, orange rust, and Phytophthora





Triple Crown



Chester



Hull Thornless



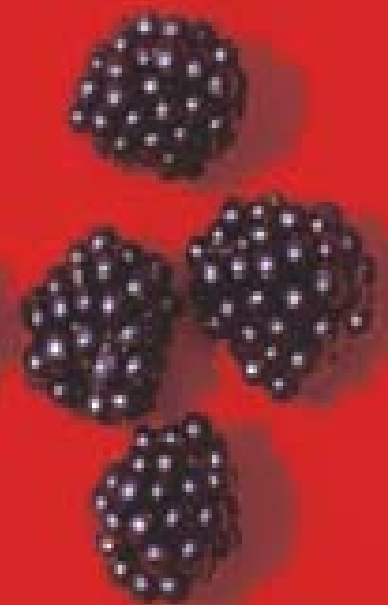
Chesapeake



Triple Crown



Chester



Hull Thornless



Black Satin Semi-erect Thornless

- Ripens early to midseason
- Large, firm, glossy, black fruit; shine fades when mature
- Excellent flavor and yields
- Resistant to anthracnose and leaf spot
- Tolerant of mildew
- More winter-hardy than other cultivars.



Cultivar Evaluation - UKREC

	Yield lbs / Acre		Berry Size (g)		Harvest Periods	
<u>Cultivar</u>	<u>2002</u>	<u>2003</u>	<u>2002</u>	<u>2003</u>	<u>2002</u>	<u>2003</u>
<u>Thornless</u>						
Apache	9,801	3,525	7.6	7.0	6/27-8/1	7/9-8/4
Arapaho	3,454	807	3.5	2.6	6/18-7/12	6/26-8/4
<u>Thorny</u>						
Kiowa	7,499	3,194	8.7	6.7	6/18-8/1	6/26-8/4
Chickasaw	6,192	NA	7.0	NA	6/18-7/26	NA



Harvest Dates

Thornless Blackberry, Lex. 2003

Variety	First Harvest	Mid Point ¹	Last Harvest
Arapaho	June 26	July 8	Aug. 14
Apache	July 8	July 26	Aug. 14
Triple Crown	July 1	July 25	Sept. 4
Hull Thornless	July 1	July 28	Sept. 4
Chester	July 8	Aug. 7	Sept. 9

¹ Date on which half of the berries were harvested, based on berry weight.

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Plant Spacing and Management Systems

Blackberry Type	In Row Spacing (ft)	Between Row Spacing (ft)	Plants/A	Management system
Erect Thorny	2	10-12	2,178-1,815	Hedgerow No trellis
Erect Thornless	3	10-12	1,452-1,210	Hedgerow Low trellis
Semi-erect Thornless	6-8	12-13	605-418	High Trellis
Primocane Fruiting Thorny	2-3	10-12	2,178-1210	Hedgerow No trellis

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Erect Thornless Trellising

- Canes should be supported by a simple trellis. Plastic bailer twine can be wound on both sides of the plants at a height of about 3' between metal fence posts that are located every 24' or so in the row.
- Primocanes should be summer tipped when they reach a height of 36 to 42 inches. Vigorous canes can be summer tipped a second time if growth reaches a height of one foot above the previous tipping.

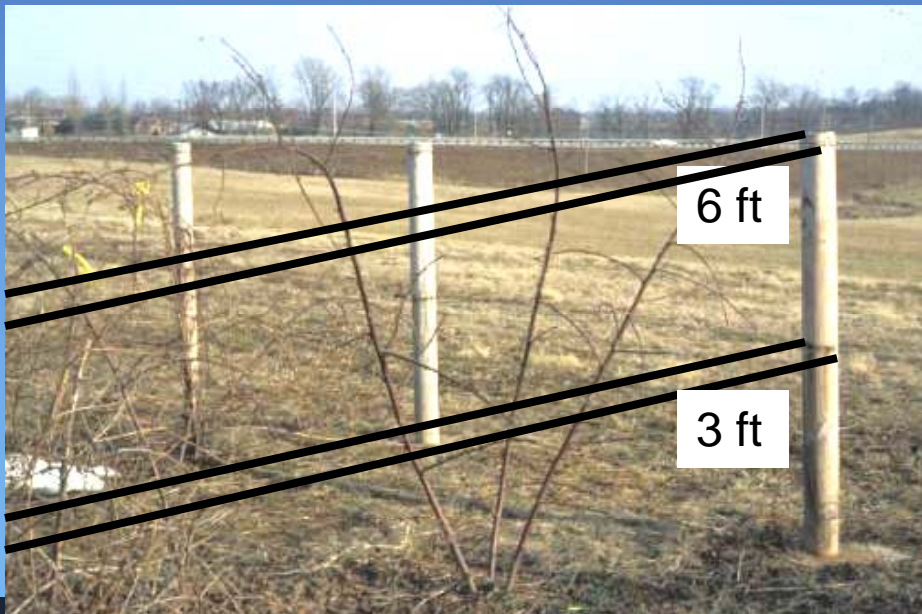
Erect Thornless – If No Trellis



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Traditional Trellis Semi-erect Blackberries

- Two-wire trellis
- Involves tying each cane to the wires.



Improved Double T-Trellis Semi-erect Blackberries

- Plants were trained on a double-T four wire trellis with the lower two wires 2 ft apart and top two wires 4 ft apart.



Semi-Erect Thornless Trellising

- Canes should be supported by a permanent trellis. A four wire double T trellis is recommended. If a two wire vertical trellis is used, canes will need to be fanned out on the trellis and loosely tied to the trellis wires.

New Trellis Design

Single-Sided Shift-Trellis



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Single-Sided Shift-Trellis Perspective Views

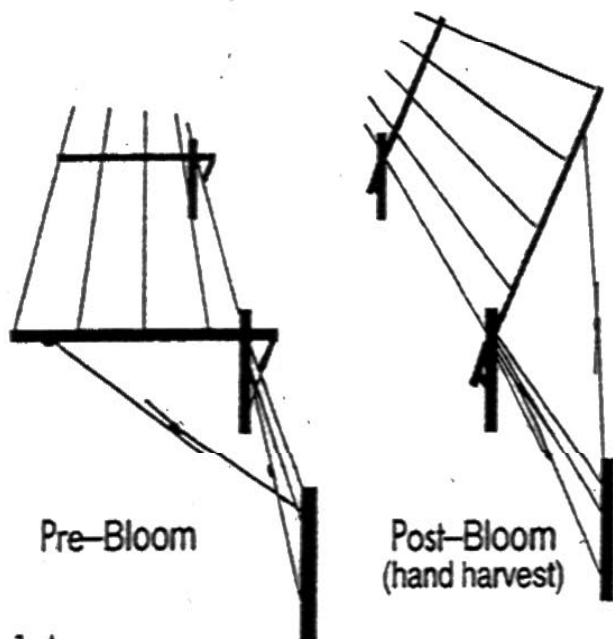






Figure 1-A

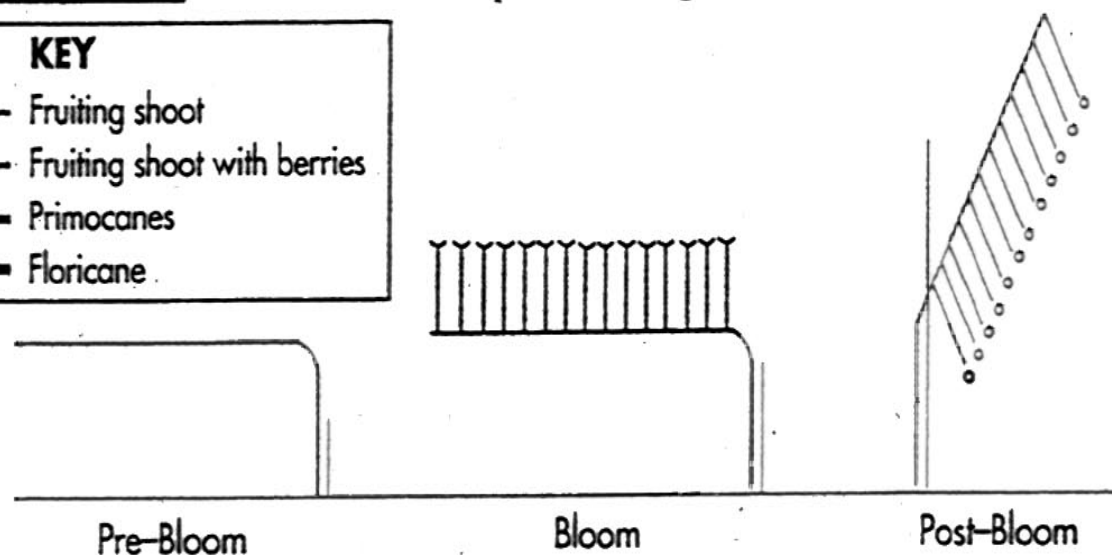
Single-Sided Shift-Trellis Conceptual Diagram

Figure 1-B

With the arm of the Single-Sided Shift-Trellis positioned horizontally through bloom (above and to the right), fruiting shoots, growing toward the light, are trained skyward. Once bloom occurs, the arm is rotated 20° to 30° over the top. The result is a highly visible, accessible crop.

KEY

-  Fruiting shoot
-  Fruiting shoot with berries
-  Primocane
-  Floricane



Single-Sided Shift-Trellis



Single-Sided Shift-Trellis



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Pruning 1 year old plants

- Blackberry cane growth tends to be more trailing during the first season. Growth during the second season will be more erect.
- Canes should be pruned off where they begin to arch toward the ground. Canes that are laying on the ground should also be removed.
- Pruning up to 50% of last seasons growth off will help build up the root system, reduce this seasons fruit production and allow for vigorous growth this season to substantially increase yields the third season.
- Any canes that have swellings along their length should be cut out and burned or removed from the area. The swollen parts of the canes are where red-necked cane borers are overwintering.

Pruning 1 year old plants



2 Year Old

Notice runners from year 1 and
vertical growth from year 2



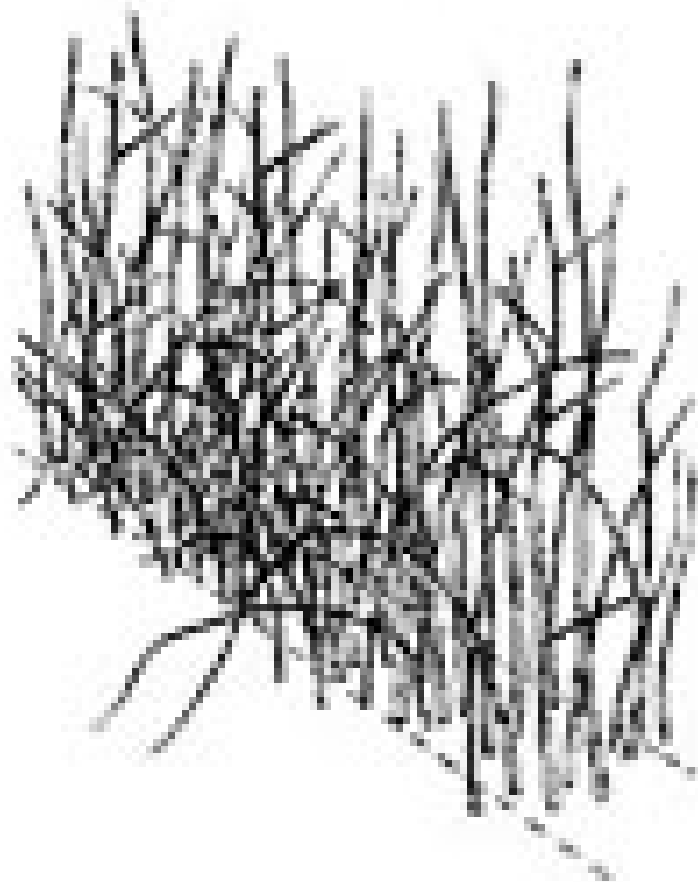
Pruning Thorny Blackberry

- Remove any dead canes left from last season and cut out any broken canes.
- Remove canes (fruiting canes) at their base that are spindly or growing out in the walkways. Since thorny blackberries send up suckers, if they are not cut out of the walkways they will take over. Try not to let the row width get much wider than 12" at the base.
- Leave 6 of the largest diameter canes per foot of row. The largest diameter canes will produce the largest fruit.

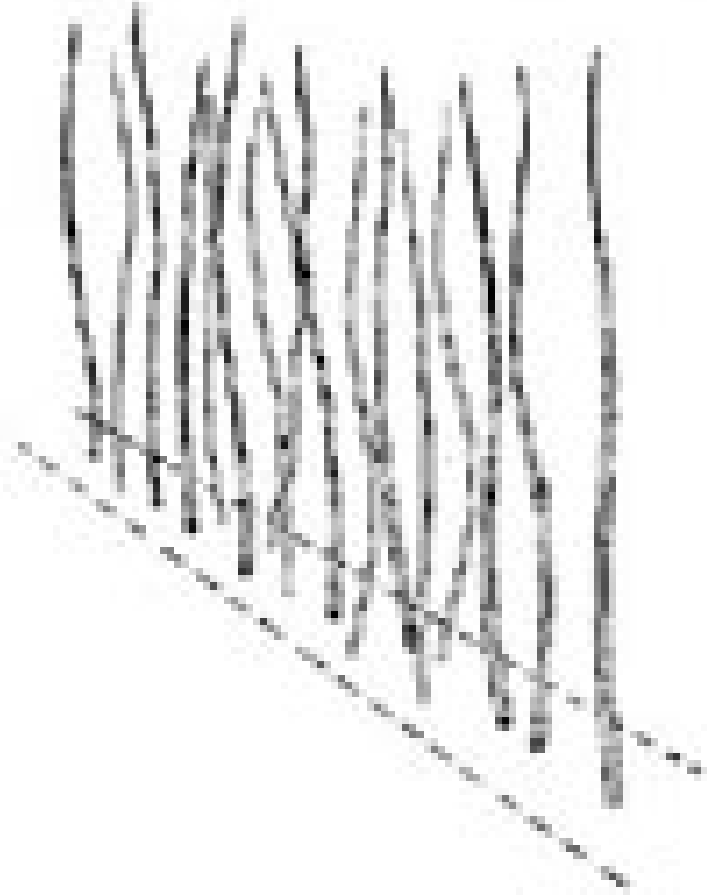


Pruning Thorny Blackberry

BEFORE PRUNING



AFTER PRUNING



Pruning Thorny Blackberry Mature Plants

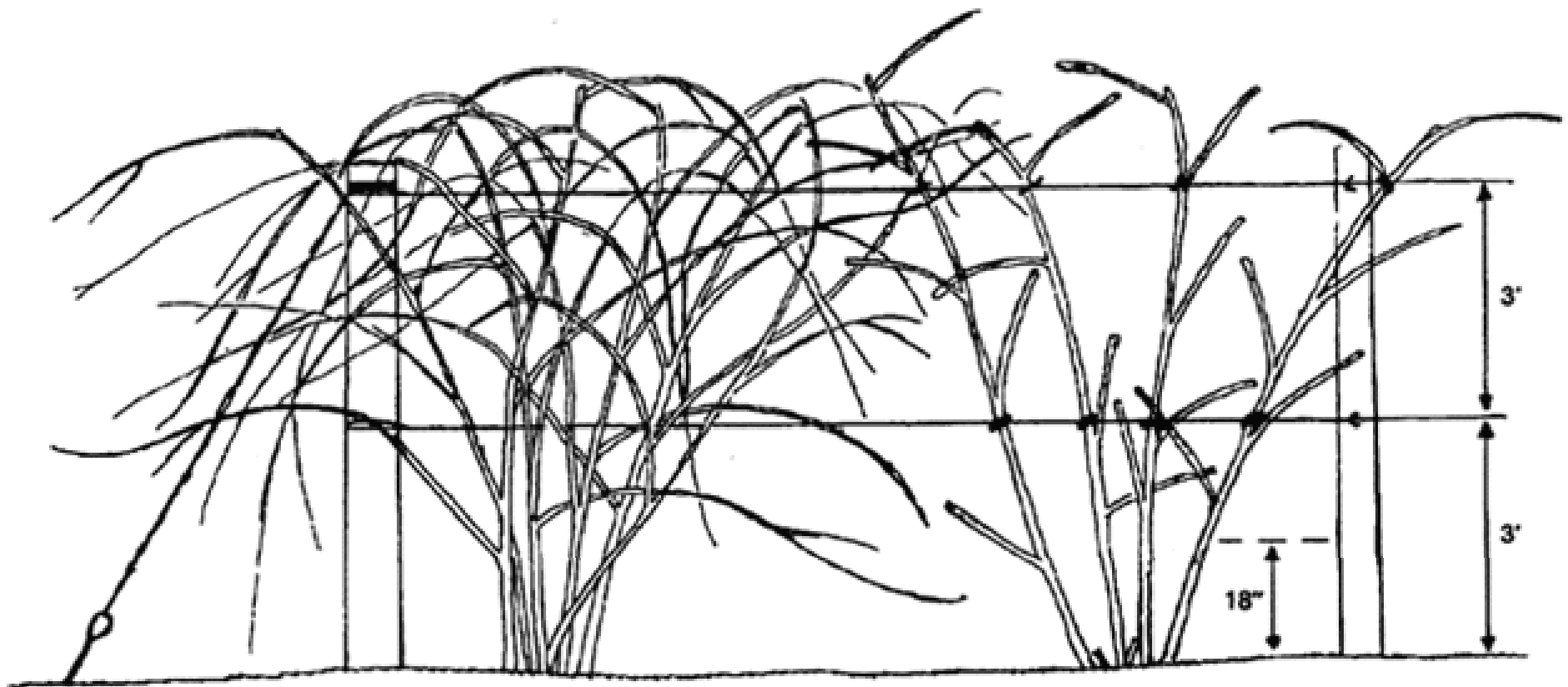
- Cut the lateral shoots on the remaining canes back to a length of 12 to 16".
- In early summer, summer tip the new canes, removing 1 to 2 inches off the tip at a height of 36 to 42 inches. This should be done while they are dry to avoid transferring diseases and to induce lateral branching. This will also stiffen the canes so that they will self support.

Pruning Thornless Blackberry Mature Plants

- Summer - Pinch the primocane tips (at 3 ft for erect, and at 6 ft for semi-erect) to encourage lateral development.
- Spring – Remove dead fruiting canes from the previous season.
- Remove 1/3 to 1/4 of the total number of canes arising from the ground, weak and small canes first.
- Cut laterals to 12 – 16” in length.
- When growth begins: Strip growth from main canes within 18” of the ground.



Pruning Semi-erect Blackberry



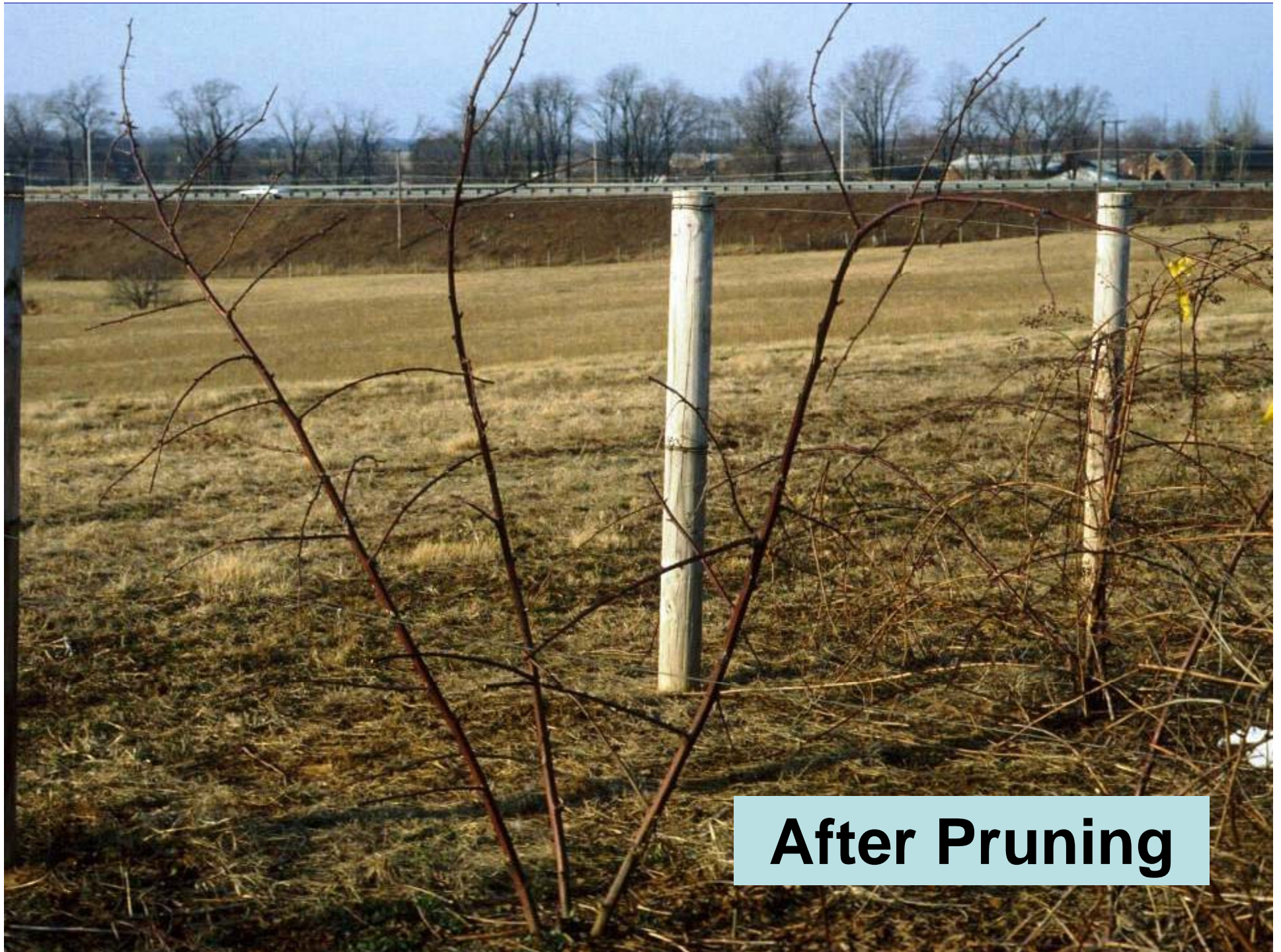
Before

After





Before Pruning



After Pruning

Conventional Pruning System

Semi-erect Blackberries

- Primocanes are tipped when they extended one foot above the top of the trellis. Dead fruiting canes that already cropped are removed in the fall.
- During dormant pruning, 1/3 to 1/4 of the total number of fruiting canes arising from the ground are removed, this includes spindly canes and/or those that have red-necked cane borer swellings.
- Lateral branches are pruned back to 18 inches in length and low laterals within 18 in of the ground are removed.
- Primocanes can be tipped when they reach a height one foot above the top trellis wire, but this is not necessary

Oregon Pruning System Semi-erect Blackberries

- **Primocanes are not summer tipped.**
- **In the spring fruiting canes are not thinned, except for those with red-necked cane borer swellings.**
- **Only low laterals were pruned off. The remaining, unpruned laterals were wound around the closest trellis wire.**
- **Primocanes are not tipped at all**

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Expected Fruit Yields

Blackberry – erect	3.5 qt / plant
Blackberry - semi-erect	14 qt / plant
Raspberry – red	0.5 pt / ft of row
Raspberry – black	2 qt / plant

Erect Thornless Yields 2002

Variety	Yield (lb/A)	Yield (qt / plant)	Berry Size (g)	Soluble Solids (%)
Apache	6,131 a	3.5*	6.6 a	10.6 a
Arapaho	2,947 a	1.7	7.0 a	10.9 a

Expected Yield / plant = 3.5 qt

Means within a column followed by the same letter are not statistically different.



Erect Thornless Training Systems 2002

Training System	Yield (lb/A)	Yield (qt/plant)	Berry Size (g)	Soluble Solids (%)
No trellis	3,786 a	2.2	6.0 a	11.0 a
Low trellis*	5,291 a	3.1*	7.6 a	10.4 b

Expected Yield / plant = 3.5 qt

Means within a column followed by the same letter are not statistically different.



Semi-erect Thornless Yields 2002

Variety	Yield (lb/A)	Yield (qt/plant)	Berry Size (g)	Soluble Solids (%)
Hull Thornless	13,158 a	22*	5.4 b	8.6 c
Chester	10,865 a	18*	5.2 b	10.6 b
Triple Crown	9,815 a	16*	6.9 a	11.9 a

Expected Yield / plant = 14 qt

Means within a column followed by the same letter are not statistically different.



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Semi-erect Thornless Yields 2003

Variety	Yield (lb/A)	Yield (qt/plant)	Berry Size (g)	Soluble Solids (%)
Chester	24,905 a	42*	6.1 b	9.2 b
Hull Thornless	21,941 a	37*	6.2 b	7.7 c
Triple Crown	11,082 b	19*	7.8 a	10.7 a

Expected Yield / plant = 14 qt

Means within a column followed by the same letter are not statistically different.



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Semi-erect Thornless Training Systems 2002

Training System	Yield (lb/A)	Yield (qt/plant)	Berry Size (g)	Soluble Solids (%)
Conventional	10,722 a	18.3*	6.0 a	10.3 a
Oregon system	12,037 a	20.5*	5.7 b	10.4 a

Expected Yield / plant = 14 qt

Means within a column followed by the same letter are not statistically different.



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Table 1. Estimated five-year yields by variety.

		Yield in Quarts/A				
		Year 1	Year 2	Year 3	Year 4	Year 5
Thorny	1,815 plants/A 2'x12'	0	0	2,000	4,000	5,000
Thornless erect	1,210 plants/A 3'x12'	0	0	2,000	4,000	5,000
Thornless semi-erect	500 plants/A 8'x12'	0	0	2,250	4,500	6,000

Blackberry returns are calculated based on a price of \$2.00 per quart.

Table 2. Estimated five-year returns by variety.

Variety	Total Costs Years 1-3 (Less Year 3 Revenue)	Return to Management Year 5	5-Year Return to Management
Thorny	\$4,778	\$4,905	\$5,374
Thornless erect	\$7,570	\$4,885	\$4,405
Thornless semi-erect	\$5,813	\$6,328	\$6,569

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Bearing Bramble – Preemergence Annual grasses and small-seeded broadleaves

- **Devrinol 50DF (napropamide 0.5 lb ai/lb) at 8 lb in min. 20 gal of water**
- **Apply under newly planted or established brambles in late fall to spring on weed-free soil. If weeds are present, supplement with a postemergence herbicide. If no rainfall occurs within 24 hours after treatment, cultivate or irrigate to incorporate. Do not apply on frozen ground. Do not allow spray to contact fruit or foliage. Granular formulations such as 10G are available.**



Bearing Bramble – Preemergence

Annual grasses and small-seeded broadleaves

- **Karmex 80DF, others (diuron 0.8 lb ai/lb) at 2 lb on sandy soil or light-colored soils and 3 lb on heavy or dark-colored soils in 25-40 gal of water**
- **Apply in spring before weeds emerge and before canes leaf out. Plants must be at least 1 year old prior to application.**

Bearing Bramble – Preemergence

Annual grasses and small-seeded broadleaves

- **Princep 4L, others (simazine 4 lb ai/gal) at 2 qt on sandy or light-colored soils and 4 qt on heavy or dark-colored soils in min. 20 gal of water**
- **Apply in spring before weeds emerge and before canes leaf out, or split application 2.5 lb in fall followed by 2.5 lb in spring. Where plants are less than 6 months old, apply 1/2 the above rate. Do not apply when fruit is present, or illegal residues may result.**

Bearing Bramble – Preemergence

Annual grasses and small-seeded broadleaves

- **Sinbar 80WP (terbacil 0.8 lb ai/lb) at 1-22 lb in min. 20 gal of water**
- **Apply only to soil beneath canes established at least 1 year. Apply in fall or early spring before weed growth begins or fruit set occurs. Do not apply within 70 days of harvest. Do not use on soils of less than 2% organic matter, or where roots are exposed.**

Bearing Bramble – Preemergence

Annual grasses and small-seeded broadleaves

- **Surflan 4AS (oryzalin 4 lb ai/gal) at 2-6 qt in 20-40 gal of water**
- **Apply to soil beneath canes in the fall or early spring before fruit set or before weeds emerge. Include a burndown treatment if existing weeds are present. Avoid contact with foliage or fruit. Rainfall or irrigation of 0.5-1 inches is required to activate Surflan. A shallow cultivation (1-2 inches) will destroy existing weeds and place Surflan in the zone of weed seed germination.**

Bearing Bramble – Preemergence

Annual grasses and small-seeded broadleaves

- **Solicam 80DF (norflurazon 0.8 lb ai/lb) at 2.5 lb on sandy or light-colored soils and 5 lb on heavy or dark-colored soils in min. 20 gal of water**
- **The listed rates are the maximum quantity allowed per season. Apply as a directed spray to soil surface from fall to early spring before weeds emerge. Rainfall or irrigation within 4 weeks of application is necessary for product activation. Application may result in temporary bleaching or chlorosis of the leaves, from which the plant will recover. Plants must be established at least 12 months. Raspberries can be very sensitive to Solicam. Use with caution.**



Bearing Bramble – Preemergence Annual and Perennial grasses and Broadleaves

- **Casoron 4G (dichlobenil 0.04 lb ai/lb) at 100 lb**
- **Apply on established plants as a surface application between November 15 and February 15 to weed-free soil. Do not apply during new shoot emergence.**

Bearing Bramble – Postemergence

Most annual and perennial grasses

- **Poast 1.5EC (sethoxydim 1.5 lb ai/gal) at 1.5-2.5 pt in 10-20 gal of water**
- **Add 2 pt of a crop oil concentrate. Apply as a directed spray when grass is actively growing. Pre-harvest interval is 45 days. Do not apply more than 2.5 pt per application or 5 pt per season.**

Bearing Bramble – Postemergence

Most annuals and top kill of perennials

- **Gramoxone Extra 2.5L (paraquat 2.5 lb ai/gal) at 2-3 pt in 50-100 gal of water**
- **Apply as directed spray to emerged weeds before new shoots emerge. Avoid contact with new shoots, as injury will occur. Use low pressure to produce a coarse spray. Add non-ionic surfactant at 1-2 pt or crop oil at 1 gal per 100 gal water for best results.**
Restricted use pesticide.

Bearing Bramble – Postemergence Annuals and some perennial grasses and broadleaves

- **Roundup Ultra, others (glyphosate 4 lb ai/gal) at 0.5-5 qt in 10-40 gal of water**
- **Apply as preplant broadcast application for control of roots and rhizomes of perennial weeds or in established plantings as a directed spray or wiper application to actively growing weeds. Applications should not be made on shoots, canes, or foliage. 14 days PHI.**

Non-Bearing Bramble – Preemergence

Most annual grasses and broadleaves

- **Snapshot 2.5TG (Pre-packaged mix of isoxaben and trifluralin) at 100-200 lb**
- **Do not apply to newly planted plants until soil has settled. Do not use within 12 months of first harvest. Rainfall required within 21 days of application for activation.**

Non-Bearing Bramble – Preemergence

Most broadleaves

- **Gallery 75DF (isoxaben 0.75 lb ai/lb) at 0.66-1.33 lb in min. 10 gal of water**
- **Apply in late summer to early fall; or in early spring prior to weed germination or immediately after cultivation. Do not apply to newly transplanted blueberries until soil has settled. Do not apply within 12 months of harvest. Rainfall required within 21 days of application for activation.**



Non-Bearing Bramble – Postemergence

Most annual and perennial grasses

- **Fusilade DX 2EC (fluazifop 2 lb ai/gal) at 1-1.5 pt in 25 gal of water**
- **Add 1 qt crop oil concentrate or 1 pt spreader. Apply as a directed spray when grass is actively growing. Do not apply if rainfall is expected within one hour of application. Do not apply to plants that will be harvested within one year after application.**

Non-Bearing Bramble – Postemergence

Most annual and perennial grasses

- **Select 2EC (clethodim 2 lb ai/gal) at 6-8 fl oz**
- **Add 1 pt crop oil concentrate containing at least 15% emulsifier. May be applied as a spot treatment at 1/2% to 1% (0.65-1.3 fl oz per gal) plus crop oil concentrate at 1.3 fl oz per gal. Grasses should be actively growing. Do not apply to plants that will be harvested within 1 year after application.**

Non-Bearing Bramble – Postemergence

Most annual and perennial grasses

- **Touchdown 5EC(sulfosate 5 lb ai/gal) at up to 6.4 pt in 10-30 gal of water**
- **Rate depends on weed species. Apply as preplant broadcast application for control of roots and rhizomes of perennial weeds or in established plantings as a directed spray or wiper application (1 qt/gal water) to actively growing weeds. An approved surfactant or wetting agent containing at least 75% active ingredient at 2 qt per 100 gal water is required to improve coverage of weed foliage. Do not allow spray to contact any plant part other than mature brown woody bark or sever injury may result. Touchdown can be applied up to bloom stage during harvest years. Can be applied as site preparation and up to 1 year of harvest.**



Non-Bearing Bramble – Postemergence

Most annual and perennial grasses

- **Fusilade DX 2EC (fluazifop 2 lb ai/gal) at 1-1.5 pt in 25 gal of water**
- **Add 1 qt crop oil concentrate or 1 pt spreader. Apply as a directed spray when grass is actively growing. Do not apply if rainfall is expected within one hour of application. Do not apply to plants that will be harvested within one year after application.**