CRANBERRY CARBON BUDGET

About this time every year I get the question "What fertilizer can I add to make the pinheads develop into large fruit?" This question makes the assumption that fertilizer is limiting to fruit growth. If you know that all of the major elements are in the adequate range (see my article in the last issue on tissue analysis) you know that fertility is not the problem. If this is the case, adding more fertilizer **will not** make pinheads set!

Two factors have been identified as limiting to cranberry yields: the number of fruiting uprights per ground area and the number of fruit per upright. Lets take these in reverse order. The number of fruit per upright is commonly known as fruit set. We could increase yields markedly if we could set only one more berry per fruiting upright. Several research projects have shown that there is competition between fruit on an upright for resources. That is one reason why lower early forming fruit are more likely to set than upper later forming fruit.

In my research program we have been investigating how much carbohydrate is available for vegetative growth or fruit growth. We measured photosynthesis at intervals throughout the season and occasionally throughout an entire day. We then used this information to estimate how much carbon an individual upright can "fix" during a season. This amount is roughly the amount available for upright and fruit growth. We then compared this to the amount of carbon found in a typical fruit to see how many fruit could be supported by an average upright. For Stevens we found that a typical upright captures about 0.45 grams of carbon during the course of a year. Some of this carbon is used for respiration at night and some is used to create new leaves and stems. We'll estimate that is about 20%. That leaves about 0.36 grams of carbon available for fruit growth. A typical Stevens berry weighs about 1.5 grams. About 85% of that weight is water leaving about 0.225 g dry weight. Roughly 5% of the dry weight is the mineral fraction and the balance is lipid, protein and carbohydrate. This comes to about 0.214 g. Not all of what remains is carbon (some is hydrogen and oxygen). Some researchers have suggested multiplying this number by 0.45 to give grams carbon. That gives 0.09 grams of carbon per fruit. There is a respiratory cost associated with growing the fruit that we estimate is equal to the final carbon content giving a grand total of 0.18 grams of carbon per fruit.

Grams carbon fixed per upright	0.45
Loss to respiration & growth	(0.09)
Net carbon available per upright	0.36
Grams of carbon per mature fruit	0.09
Respiratory cost of growth	0.09
Total carbon cost per fruit	0.18

When the arithmetic is all done we can see that the amount of carbon available per upright compared to the amount of carbon required to grow a fruit allows for production of about 2 fruit per upright. The point of this exercise is to attempt to show that carbohydrates are likely the limiting factors for fruit set. A typical upright has enough carbon to support roughly two fruit. You should also understand that our estimates of photosynthesis are based on

all clear sunny days with adequate temperatures. Our estimate of carbon available is likely too

high. On the other hand our estimate of the respiratory cost to produce a fruit is likely too high, so the two may cancel each other out.

If our estimates are correct, can you increase yield and fruit set by adding fertilizer? **NO!** Once the tissue has adequate amounts of fertilizer, adding more is wasteful, not helpful. What can you do to increase photosynthesis? You can manage pests, keep weeds from competing (particularly early), make sure your fertility program is adequate and you can hope for cooperative weather. Good overall management will provide maximum photosynthesis.

Teryl Roper and Marianna Hagidimitriou, UW-Horticulture

BUDS

Bud counts have become an important means of determining crop potential. However, all bud counts are not taken, or interpreted, in the same way. Some of our industry believe that all buds are reproductive. We believe, through five years of experience that a bud can be either reproductive or vegetative. We base our determination on appearance and dissection. Magnifying devices and conducting the counts SLOWLY with emphasis on detail is vital.

In the spring of 1993, we began a bud determination study. In early May, before bud swelling, uprights were tagged in this manner:

- Blue tags were placed around uprights having a bud, which by its appearance, would become a vegetative upright.
- Red tags were placed around only those uprights with buds which met the specifications of reproductive uprights in 1993.

These uprights were allowed to continue to grow in the field and were not treated any differently than the rest of the marsh for the entire summer season. * *Note*: the tagging process did not harm or interrupt the growth of the uprights in any way and the locations were random sightings within the Stevens variety.

In late July, the uprights were examined and the results are as follows:

1. Of the buds marked to become vegetative, 40% were reproductive and 60% were vegetative.
2. Of the buds marked to become reproductive, 12.5% were vegetative and 87.5% were reproductive.

CONCLUSIONS:

1. Not all buds will become Reproductive Uprights.
2. Do not judge a bud only by its appearance. Bud counts must be conducted with magnifying devices, and with CARE. One must be prepared to dissect should something be questionable.

In doing the 1994 bud counts we have chosen to document details of why buds are what they are. For example: If a grower has only 32% reproductive uprights, what is going on with the other uprights in that square foot area? Is it tipworm? If so, has there been side-shooting, are there any other signs of repair? What kinds of stress are obvious? Canker?, red leaf spot? Are there other fungi growing? What about plant health? Excessive growth? Lethargic vines? Documentation of every detail is vital in understanding crop potential and then actual yield.

Jayne & Theresa Sojka, Lady Bug IPM

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The biggest trouble with a sure thing is the uncertainty!

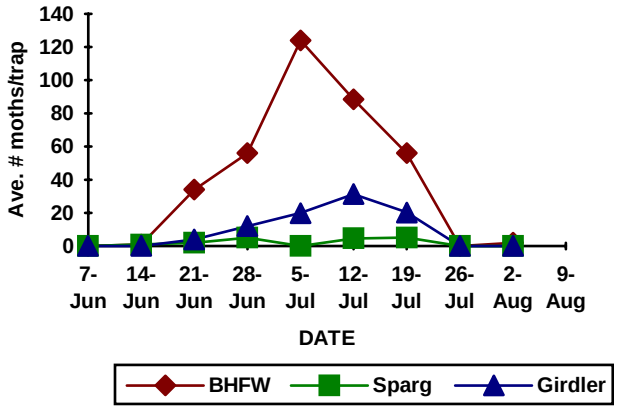
1993 PHEROMONE TRAP COUNTS

Cranmoor area includes:	Wood, Portage and Adams
Warrens area includes:	Jackson, Monroe, and Juneau
Northeast area includes:	Vilas, Forest, Oneida, Lincoln and Price
Northwest area includes:	Douglas, Burnett, Washburn, Sawyer, Barron and Rusk

Please note that different regions may have different scales on the left axis. Doing this allows greater accuracy in determining actual values within a region. However, comparisons between regions are more difficult. Please use caution in making comparisons of these averages to trap counts on your marsh.

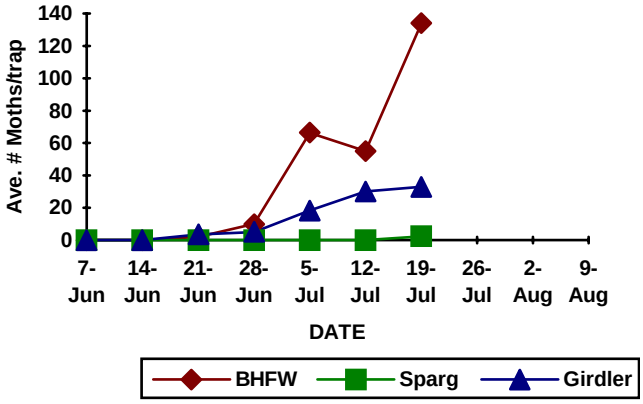
Means from 27 growers

Northwest Area



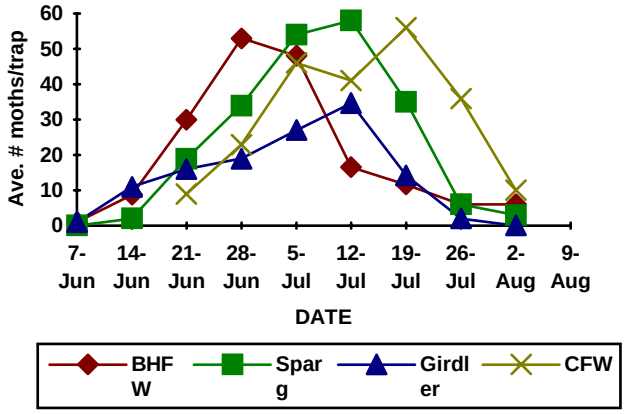
Means from 9 growers

Northeast Area

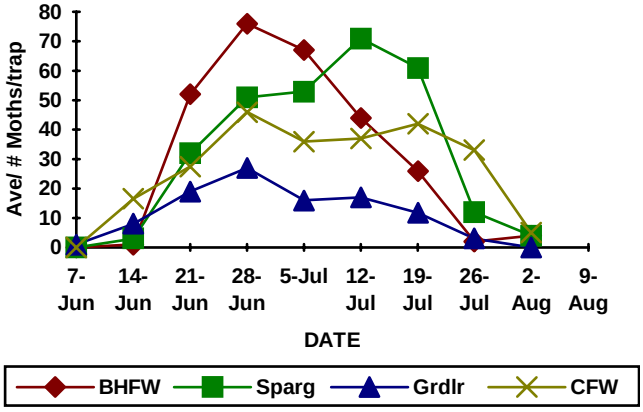


Means from 8 growers

Warrens Area



Cranmoor Area



Means from 9 growers

WEATHER

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