



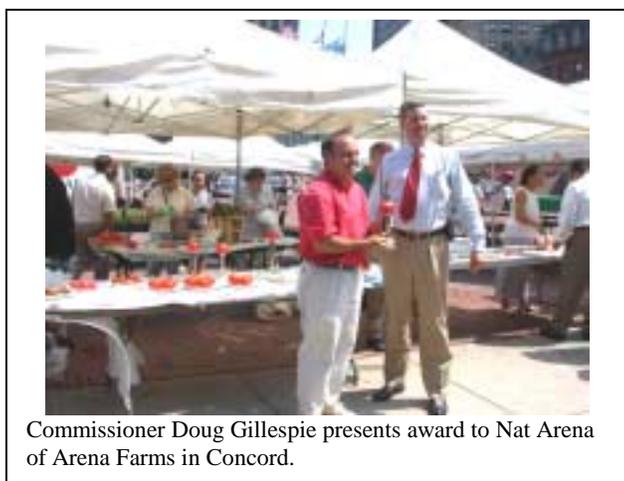
VEGETABLE IPM MESSAGE

AUGUST 22, 2002

VOLUME 13, NUMBER 17

CROP CONDITIONS

Harvest of all summer crops continues, but drought affects are being widely felt. Rain came this week...but barely enough to dampen the dust. The same weather front brought cooler temperatures; unfortunately, it also brought **huge numbers of Corn Earworm Moths**. Counts are in the 200-400 range in the Ct River Valley and the Southeast. Irrigation is critical, but water ponds and streams are being sucked dry and are not refilling. Many fields cannot be reached by irrigation. Drought advisories and water restrictions have been re-imposed on the Connecticut River Valley. Fall crops (e.g. pumpkins, winter squash) are at a critical stage where they need a good soaking rain. Soil temperatures and sun intensity have so high that crops are being burned. High temperatures in the 90 to 101° F range were found throughout New England this week. Low's were in the 50's and 60's, after the front came through. Precipitation ranged from 0 to 0.97 inches. On the bright side, there is still a high demand for produce.



Commissioner Doug Gillespie presents award to Nat Arena of Arena Farms in Concord.

MASSACHUSETTS TOMATO CONTEST

The 18th Annual Massachusetts Tomato Contest and Festival was held at the Boston City Hall Plaza on August 19. More than 50 tomato entries competed for awards in the slicing, cherry, heirloom, and heaviest categories. Tomato trophies were awarded to the top three winners in each category and certificates are given to the top ten winners in each category.

Massachusetts is the largest tomato producing state in New

Winners of Tomato Contest	
Farm	Variety
SLICING CATEGORY	
1. Blue Heron Farm (Franklin)	Trust
2. Wards Berry Farm (Sharon)	Sunbeam
3. Gove Farm (Leominster)	Merced
CHERRY CATEGORY	
1. Red Fire Farm (Granby)	Matt's Wild Cherry
2. Freitas Farm (Middleboro)	Sun Gold
3. Freitas Farm (Middleboro)	Matt's Wild Cherry
HEIRLOOM CATEGORY	
1. Ward's Berry Farm (Sharon)	Cherokee Purple
2. Red Fire Farm (Granby)	Rose de Burn
3. Red Fire Farm (Granby)	Speckled Roman
HEAVIEST CATEGORY	
1. Ward's Berry Farm (Sharon)	Striped German (1.88 lbs)
2. Gove Farm (Leominster)	Mountain Fresh (1.87 lbs)
3. Arena Farm (Concord)	Beefmaster (1.67 lbs)

England, growing some 55 million pounds of tomatoes annually with a farm-gate value of \$4.6 million. More than 550 acres are dedicated to tomato production in the Bay State which ranks 18th in tomato production nationally.

POTATO MOP-TOP VIRUS ALERT

The Canadian Food Inspection Agency (CFIA) has announced restrictions on the importation of U.S. seed potatoes due to an outbreak of the **Potato Mop Top Virus (PMTV)**. The Mop-Top virus was first found in July at the University of Maine Aroostook Research Farm in Presque Isle. According to the Canadian Food Inspection Agency (CFIA) the virus has also been found in eight other major potato producing states including Florida, Idaho, North Carolina, Virginia, Oregon, Washington, Maryland and California. The virus already has been discovered in Canada, Europe, parts of Asia, and South and Central America. The USDA is treating the virus as a quarantine pest.

We urge potato growers to watch for symptoms of this virus and get a diagnosis confirmed if they think they might have it.

This is serious potato disease. The virus poses no threat to humans but can ruin 50% of a potato crop. The virus is vectored a soil-borne organism, and this vector can live in the soil for up to ten years. Worse yet, quarantines can reduce the value of a state's crop. The good news is the virus does not spread as easily as some other potato diseases, and spuds harvested this fall are going to be shipped, albeit with restrictions.

It is spread through the fungus associated with **Powdery Potato Scab** and cannot be spread through the air or aphids. Therefore, it should be easy to contain when it is identified.

Identification: PMTV can make potato plant leaves look feathery, and causes molting or stunting of the part of the potato that's above the ground, inspiring the label originally applied to the unruly mop-top hairdos worn by the Beatles during their early years. The virus severely damages the potato; causing vein-like rot which appears as discoloration or rings on the inside of an infected spud making them unsuitable for the fresh potato market as well as potato chip and French fry production.

Diagnosis: Please call the Disease Diagnostic Lab (413-545-1045) if you suspect that this disease is present in your field. The lab will send someone out to take a sample.

Control: How long the virus has been in the country is unclear, and it could have been here for some time. Initially, control efforts will focus on containing the disease. In Maine, an emergency quarantine order by the US Department of Agriculture immediately went into effect barring the movement of machinery, potatoes, or soil from the property and requiring workers to disinfect their clothes and boots for any fields confirmed to have the virus.

Restrictions in Shipping: The CFIA will require state-of-origin declarations on all potatoes from the United States. The agency will also require imported potatoes for processing to carry statement of origin, truck washing and identification and vehicle cleanliness certificates. Processors will also be required to follow containment, disinfection and waste disposal protocol for potatoes imported from the states affected by PMTV.

Adapted by S. DeGray & R. Hazzard from David Sharp, Associated Press, Boston Globe & Spudman Magazine, 8/20/02.

TRICKLE IRRIGATION DURING PERIODS OF HIGH MOISTURE STRESS

Trickle irrigation has several advantages. Water use can be reduced because less soil is wetted and there is less loss due to evaporation. Once the system is set up, there is little or no pipe to move, reducing labor needs and allowing for timely water application. Also, trickle irrigation lends itself to application of fertilizer.

However, with trickle irrigation, water is applied in relatively narrow bands. This causes the crop roots to concentrate in an area that is more restricted than with overhead application. As the plants extract water, the soil dries quickly because the roots are taking water from a small area with limited storage capacity. This requires that water be applied frequently to maintain adequate soil moisture levels. Crops such as squash and pumpkins have leaves covering nearly the entire field, but with trickle irrigation, the roots are taking moisture from a narrow zone. To meet the moisture needs of the crop, the root zone must be constantly moist, but not soggy. Monitor soil moisture in the root zone and apply water before it is depleted. The water demands of the crop and the water holding capacity of the soil

will determine the amount and frequency of application. When moisture stress is high it may be necessary to run the trickle irrigation system every day for up to three or four hours on some soils.

In the long term, you can improve a soil's water holding capacity by increasing organic matter. **For each percent organic matter, the soil can hold another 16,000 gallons of water!** That's why soils with high organic matter are more drought resistant. Organic matter increases capillary movement of water in the soil. This improves the horizontal movement of water and increases the width of the bands that are wetted by trickle irrigation. The size of the root zone is increased and there is a greater area from which crops can draw water.

With a restricted root zone there is also less area supplying nutrients to crops. Fertilizers, which are beyond the reach of roots, are not available to crops. It may be necessary to supply more nutrients through the trickle irrigation system to meet the crops' needs. As with moisture, nutrient uptake can be enhanced by increasing the width of the wetted area by building soil organic matter.

John Howell, UMass Extension Vegetable Specialist

HOW FARMERS CAN CONSERVE WATER: SHORT TERM AND LONG TERM OPTIONS

Once planted, crops need the right amount of water, at the right times, for successfully harvesting acceptable yields and quality.

Water conservation is always a good stewardship practice.

However, water management is even more critical during drought emergencies. This year's drought conditions only serve to emphasize how critical water management is for the success of vegetable farms.

Water should only be used when necessary and in amounts that sustain plant growth without loss of yield. Irrigation system evaluations are always recommended to improve and maintain system efficiency for sustainable crop yields. The following are some assessments and low cost actions farmers can take to conserve water and reduce waste in the short term:

- **Frequently check all system components for visible signs of leaks or damage and make repairs accordingly.** Carry out regular maintenance on pumps and power units and evaluate

irrigation system efficiency and uniformity by measuring flow rates and pressure.

- **Irrigate in the early morning or evening.** Avoid the use of overhead irrigation during the hottest or windy hours of the day.
- **Irrigate less frequently where feasible.** This may encourage deeper root system growth - using water from deeper soil layers that would otherwise be lost to deep percolation. (Currently, given shortages of water sources, this may be a necessity, not a choice.)
- **Do not over irrigate.** Excess water will run off or percolate beyond the root zone.
- **Take extra caution not to irrigate non-target areas,** particularly roads and pavements. Use part circle sprinklers on field ends or stop the traveler before it reaches the road.
- **Limit water use for non-irrigation purposes.**

In the long term, many of the measures that farmers can long-term plan and install improved irrigation systems, all the way from the water sources to delivery to the crop. These can involve substantial costs. **Vegetable growers are eligible for cost-share assistance in irrigation systems from the Natural Resources Conservation Service** through their Agricultural Management Assistance program. Cost share for irrigation systems, to offset the risks from drought, is the number one priority for this program. Technical assistance is available for assessing water needs, water sources, and system capacity, as well as in designing a new system. 75% cost share is available for the actual or average costs of wells, irrigation pits, irrigation water conveyance, sprinkler systems, and trickle systems. Incentive payments may also be available for implementing other conservation practices that improve water management. Although the deadline has passed for applications for this fiscal year, NRCS is continuously accepting applications for next fiscal year. Contact your local NRCS field office for more information.

S DeGray & R. Hazzard, Adapted from Rutgers Coop. Ext. Org. Farming Edition 8/20/02, with input from D. Johnson, MA.

NRCS Office

REMINDER: NEXT TWILIGHT MEETING: KEOWN ORCHARD, SUTTON, AUGUST 28

On **Wednesday, August 28 from 5 to 7:30 p.m. at Keown Orchards** located at 9 McClellan Road, in Sutton, MA there will be a Twilight Meeting. Features of the tour will include Jane Oliver and Artie Keown's 78-year-old Farm Stand, Farmers' Market and Wholesale operation. Their farm focuses on vegetables and tree fruit, fresh cut flowers, pick-your-own, school tours and special events. Some production techniques include, high density trellised apple orchards, plastic mulch and drip irrigation, and greenhouse season extension. There will be a tour of the farm looking at the greenhouses, orchards and field grown vegetables. Pesticide applicator credits will be offered. Contact: Jonathan Bates, (413) 529-9100 for more information.

Directions: Take Mass Pike to Exit 10A, Route 146 South. Go to the Central Turnpike Exit and go left towards Northbridge. Take your second left at Dodge Hill Road and follow signs. From the South take Route I46 North to Central Turnpike and take a right, then follow the signs.

APPROXIMATE RUN TIMES FOR SPRINKLER SYSTEMS

During drought, growers must irrigate to supply crop needs, while also conserving water by avoiding runoff and/or deep percolation. This article assists in deciding when to begin irrigation and provides approximate run-times for integrated water management.

Recommendations for Irrigation Scheduling

- Monitor soil moisture using tensiometers or watermark sensors placed in the crop root zone, or estimate using USDA-NRCS booklet, *Estimating Soil Moisture by Feel and Appearance*, available from your local NRCS office.
- Start irrigation no later than 50% moisture depletion (Table 3) in the effective root zone depth.
- Available soil water and maximum rates are affected by soil texture. Adjust run time hours listed (Table 1) to apply more or less than 1" application based on soil texture and available water holding capacity. Do not exceed rates in Table 2.

Irrigation Frequency for 1" Application

- Based on Et rates of 0.2"/day during the peak growing season, and no rainfall, apply 1" every 5 days.

Table 1. Rates of application (inches/hr) and hours of run time for a 1" net depth of application at 75% system efficiency. Interpolate run times and application rates for different nozzle flow rates.

Sprinkler Spacing	3 GPM/Nozzle	5 GPM/Nozzle	10 GPM/Nozzle
40' X 40'	.18"/hr - 7hrs.	.3"/hr - 4hrs.	.6"/hr - 2hrs.
40' X 50'	.14"/hr - 9hrs.	.24"/hr - 5.5hrs.	.5"/hr - 2.5hrs.
40' X 60'	.12"/hr - 11hrs.	.2"/hr - 7 hrs.	.4"/hr - 3hrs.
50' X 50'	.11"/hr - 12hrs.	.19"/hr - 7hrs.	.38"/hr - 3.5hrs.
50' X 60'	.09"/hr - 15hrs.	.16"/hr - 8hrs.	.32"/hr - 4hrs.
55' X 65'	.08"/hr - 17hrs.	.13"/hr - 10hrs.	.27"/hr - 5hrs.

Table 2. Maximum application rates by soil texture. Do not exceed the maximum application rates to avoid runoff and/or deep percolation losses.

Sand	1"/hour
Loamy Sand	.7"/hour
Sandy Loam	.5"/hour
Loam	.4"/hour
Silt Loam	.3"/hour

Table 3. Approximate Tensiometer Readings in Centibars (CB) at 50% Moisture Depletion.

Sand	20 CB
Loamy Sand	25 CB
Sandy Loam	40 CB
Loam	65 CB
Silt Loam	90 CB

Mary Beth Sorrentino, USDA Natural Res. Conservation Serv.

AIR POLLUTION DAMAGE ON PUMPKINS & OTHER VINE CROPS

Ozone levels have been elevated high during the heat waves this summer. The following article is from Ohio but may apply in Massachusetts:

Growers may notice some **unusual leaf color patterns** on their pumpkins and other vine crops. We first noticed these symptoms about two weeks ago and since then the area affected has increased in size. Our small bush type pumpkins seem to be affected more than the large pumpkin types. Symptoms first appeared a few days after an ozone alert was issued by the weather service. At first, symptoms appear to be similar to spider mite damage but no mites have been found after several inspections. Symptoms vary dependent on the pollutant. **Ozone damage** appears on the upper leaf surface, which usually has a yellow-netted appearance due to loss of chlorophyll. The leaves may also exhibit a bronze like color and the main leaf veins remain green. **Ambient oxidant injury** is initiated as a diffuse chlorotic mottle on the upper surface, which deepens until the leaf turns almost white. Leaf veins remain green.

Sensitivity to ozone among cucurbits varies with watermelon and squash the most sensitive. Pumpkin and muskmelon are intermediate in sensitivity. Cucumber is the most tolerant to ozone injury. Depending on the timing and extent of injury, yield may or may not be affected. In the case of our pumpkins, we expect no yield reduction since most of the fruit are full size and starting to show color. *Reference:* Recognition of Air Pollution Injury to Vegetation: A Pictorial Atlas. Edited by: Jay S. Jacobson, A. Clyde Hill. Air Pollution Control Association. Pittsburgh, PA. 1970.

Bob Precheur, VegNet Vol. 9, No. 19. 8/8/02, Ohio State University Extension Vegetable Crops

CUCURBITS

Fields need water. **Sun scald** is being observed in winter squash where foliage has declined. Acorn and buttercup squash are especially susceptible, and the orange splotches on the sunny side of dark green fruits can render them unmarketable. Pumpkins and other fall crops are showing gaps in fruit set, with some fruit already mature and others very young. Female

flowers have been aborting in hot weather, but may return with cooler temperatures. With adequate water and a mild fall, new young fruits may have time to mature.

Last year at this time, **Downy Mildew** caused early vine decline in many fields. This disease can be distinguished from powdery mildew by the fact that the fuzzy fungal growth occurs only on the undersides of leaves, and is usually purplish, not white. Yellow spots may be seen on the upper surface (these may also be found if powdery mildew was present, but has been controlled by a fungicide). If Downy Mildew is present, the following materials are recommended: Alliette WDG, Ridomil/Bravo, or Ridomil Gold MZ.

Robert Wick and Ruth Hazzard

TOMATO

Tomatoes are coming in strong but quality and quantity may be reduced by cold (earlier), and by drought and heat (recently).

Watch for **Two Spotted Spider Mites** (TSSM) (see previous newsletters) and **Tomato Hornworms**, which are reported by Gary Guida to be high in central Mass. Dale Riggs notes that tomato fields, which were showing mild infections of Bacterial Canker last week, are now almost entirely brown. The marginal scorch progresses to kill whole leaves, and then whole plants.

TOM-CAST: DSV counts reached 15 new DSV's in 8 days this week. See www.umassvegetable.org for more details.

Will Corn Earworm (CEW) be a pest in tomato? Tomato Fruitworm, which is the name this caterpillar takes as soon as it wanders into a tomato field, is a serious pest of tomato in southern states. In New England it rarely causes a problem in tomato, probably because the *moths prefer to lay their eggs in silking corn*, which is far more abundant here than tomatoes. However, with CEW moth flights at extremely high levels, there could be some risk. Tomato Fruitworm eggs are laid on the underside of leaves, usually in the upper third of the plant, frequently on the leaf immediately below the uppermost flower on a plant. Caterpillars feed on foliage for 1 to 6 days, and then invade fruit. The following recommendations come from North Carolina (*Scouting Staked Tomatoes in North Carolina*, Pub AG-496, NC Coop Ext. Service): **Scout for eggs** if trap

captures exceed 20 moths per week. To scout, look at one terminal per plant, on ten plants in a row. Do this at five locations in the field. A terminal is the area from the top of the plant down to the most recent fully expanded leaf. Look for a round, single, white or creamy egg on the underside of tomato leaves. If one egg is found, a spray is warranted.

Use a selective caterpillar material (Dipel, Mattech, Spintor, Avaunt, all 0-3 DH) to avoid setting off an aphid outbreak. (Note: Bt products are likely to be effective in tomato because caterpillars chew their way into the fruit). Synthetic pyrethroids (Warrior, Asana, Baythroid, Ambush, Pounce) are also labeled but may leave you with an aphid problem.

Stephanie DeGray & Ruth Hazzard

CRUCIFERS

Keep scouting for caterpillars and spray if >15% of plants are infested with 1 or more caterpillars (for heading or leafy brassicas). **Diamondback Moths:** anticipate a large hatch on the way! Dale Riggs reports finding clusters of 3 to 5 eggs in the CT River Valley. **Cabbage Loopers** and **Imported Cabbageworm** are also at moderate to heavy levels.

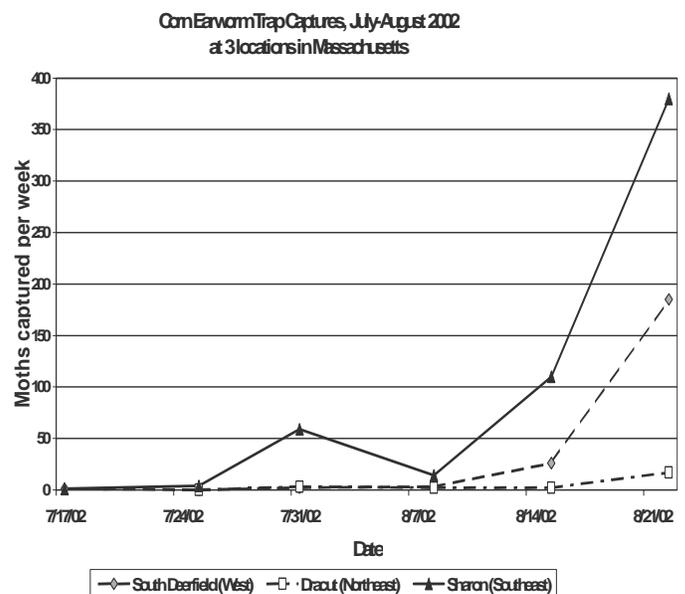
PEPPERS

With **European Corn Borer** flight remaining high (and still on the rise in some areas), pepper growers should continue a regular schedule for ECB control. Intervals recommended: Bt twice weekly (0DH); Spintor every 6-7 days at 5 oz (1DH); Orthene or Confirm at 10 days (7 DH); Ambush at 12.8 oz (3

SWEET CORN

CORN EARWORM ALERT!! Weather fronts have brought LARGE number of corn earworm moths into the state - see Graph Above. A three-day schedule is needed in the Connecticut River Valley and Southeastern Mass and a four-day schedule throughout the rest of the state. Use materials with proven CEW efficacy, including Warrior, Larvin, Baythroid, or Capture. **Target sprays at the ear zone** (this is when drop nozzles pay off). Growers using oil direct silk

DH, but well documented to promote aphid outbreaks). Some studies have shown poor ECB control with Lannate, but I have seen it recommended by some states. **Sun Scald** and **Blossom End Rot** can only be avoided by adequate irrigation to help maintain enough calcium and foliage cover. **Fall Armyworm** rarely causes feeding damage in pepper fruit in New England, but with the intense FAW activity being seen in corn, growers should watch for it. Feeding damage is similar to ECB but larvae may exit one fruit to feed on another. However, sprays for ECB should control FAW. Watch for **Two Spotted Spider Mites**, which are favored by hot and dry weather. Signs are a whiteish “stipple” on the upper surface and webbing on the underside of the leaf. Check edges near weedy borders first; spot treatments may be warranted.



applications: for best control, do not delay treatments past 5-6 days after silk initiation (wilted silk stage). Liquid lecithin (as a 5% mix in oil) can be used as an emulsifier for Dipel DF (mix Dipel as a paste in water before adding to oil). Meanwhile, **Fall Armyworm** is active at all stages (see last week’s newsletter): scout any corn in pre-silk stages for ECB and FAW. **ECB** counts remain high – numbers are still rising in many locations. Warrior has some activity against aphids, which are numerous. Some farms now have only silking corn. Heat has forced rapid maturity and bunching up of harvests.

Sweet Corn Trap Captures & Scouting Data August 16 - 22, 2002

Town	Date	ECB Z1	ECB E2	TOTAL ECB	CEW	FAW	% PT
		Iowa	New York				
Berkshire Region							
N. Bennington, VT	August 15 **	143	30	173	2	-	-
Sheffield, MA	August 21	12	3	15	24	-	-
Conn. River Valley North to South							
Walpole, NH	August 20	12	32	44	19	4	-
Plainfield, NH	August 22	28	5	33	10	5	19
Westminster, VT	August 20	19	167	186	118	21	1
South Deerfield	August 22	40	109	149	185	14	-
Whately	August 21	25	27 **	52	(Peppers)	-	-
Sunderland	August 22	28	21	49	178	-	-
Hatfield	August 22	32	27	59	65	-	28
Hadley #1	August 22	66	40	106	208	-	-
Hadley #2	August 21	35	17	52	42	0	--
Feeding Hills	August 21	14	12	26	70*	0	22
East/Central MA, North to South							
Ipswich	August 22	7	5	12	40	0	--
Dracut	August 21	21	9	30	17	-	-
Lancaster	August 22	15	19	34	25	0	--
Still River	August 21	4	6	10	15	-	-
Concord	August 19	1	21	22	47	0	22
Leicester	August 20	7	9	16	25	0	2
Northbridge	August 20	17	25	42	46	5	15
Belchertown	August 21	14	4	18	168	7	-
Dighton	August 21	1	13	14	418+	-	-
Rehoboth	August 22	23	42	65	175	--	--
Sharon	August 22	0	19	19	380	5	lots

Abbreviations:

ECB Z1: European corn borer Z (Iowa, I) strain; ECB E: European corn borer, E (New York, 2) strain.
 CEW: Corn earworm; FAW: fall armyworm.
 % PT: Percent of pre-tassel corn (unsprayed) with ECB or FAW caterpillars present, based on scouting 50 to 100 plants.
 * A nearby location in Southwick reported 283 CEW moths ** Trpa top fell off; may be a low count

CORN EARWORM THRESHOLDS

Moths/Night	Moths/Week	Spray Interval
0 - 0.2	0 - 1.4	No spray
0.2 - 0.5	1.4 - 3.5	6 days
0.5 - 1	3.5 - 7	5 days
1.0 - 13.0	7 - 91	4 days
Over 13	Over 91	3 days

Note: Spray intervals can be lengthened by one day if daily maximum temperatures were below 80° F for the previous 2-3 days.

Vegetable IPM Newsletter, Ruth Hazzard, Editor and Stephanie DeGray, Assistant Editor. The *Vegetable IPM Newsletter* is published weekly from May to September and includes contributions from the faculty and staff of the UMass Extension Vegetable Program, other universities and USDA agencies, growers, and private IPM consultants. Authors of articles are noted; author is R. Hazzard if none is cited.

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