Handling and Processing Section

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NON-FLORIDA CITRUS JUICE REPROCESSING[1]

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Abstract. **This paper presents the results of the first major census of the citrus reprocessing industry—both in the continental United States and in Canada. In all, 477 plants were reprocessing citrus and an additional 328 plants were handling prepackaged citrus products. Moreover, these plants were widely dispersed throughout the United States and Canada. The dairy plants almost exclusively produce chilled citrus juice, while at the nondairy facilities concentrate, chilled and canned juiced are produced.**

The 1982-83 citrus crop on-tree value was in excess of $900 million, making citrus fruit Florida's leading agricultural product. Only a small percent of the harvested fruit is actually sold as fresh fruit. In fact, well over 90% of the orange and 65% of the grapefruit crops are processed into single strength or concentrated juices. Citrus juice concentrate leaves Florida in retail pack or bulk form. The steadily increasing volume of bulk citrus concentrate leaving the state implies a growing out-of-state citrus juice reprocessing industry.

The findings from a Department of Citrus-sponsored survey of the out-of-state reprocessing industry are reported in this paper. The survey objective was to conduct a population census of those firms, both in the continental United States and Canada, presently reprocessing citrus juice concentrate into retail forms. This census could then supply a benchmark for future analysis of this growing industry.

The Survey

The reprocessing survey was conducted by phone between April 1982 and February 1983. In all over 1,200 facilities were contacted. If citrus juice products were produced, the plant manager or other supervisory personnel were interviewed. Plant numbers according to citrus processing activities, geographic location and plant type are listed in Table 1. The plant was labeled a dairy if it processed and packaged any dairy products; otherwise it was considered to be a nondairy. The citrus-related activities are defined as citrus reprocessors, which includes the reconstitution of citrus concentrates and the repackaging of citrus concentrate into retail pack, prepackaged citrus handlers, and the firms which exhibited no citrus activities. Sixteen U.S. nondairy plants reported direct processing from fruit as well as reprocessing from concentrate. The preliminary findings pertaining to the U.S. dairies were reported last year in these proceedings. For that reason the U.S. dairies will be covered only briefly.

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Table 1. Out-of-state citrus reprocessing survey overview (1, 2, 3).[z]

Plant category	Citrus activity level: re-processor	handler	no citrus	total
	(number of plants)			
United States—nondairy	76[y]	19	132	227
United States—dairy	312	209	215	736[z]
Canada—nondairy	34	14	26	74
Canada—dairy	55	86	58	189
Total	477	328	341	1226

[z]Dairies producing consumer ready fluid milk products plus a random sample of 47 other dairies.
[y]Includes 17 plants reporting processing from fruit as well as reprocessing from concentrate.

The Results

Perhaps the most interesting result of the survey is the large number of plants outside of Florida which are reprocessing and/or handling citrus juice products. In all, 477 plants were identified with some reprocessing activities and these plants were located throughout the United States and Canada. It was noted that at least one plant was found in each of the continental U.S. states, excepting Nevada, and in every Canadian province. The number of citrus reprocessing plants by region or province are shown in Fig. 1 and 2.

A substantial percentage of the U.S. nondairy reprocessing facilities are located in California, the West, and the South Central regions (32 or 42% of the U.S. nondairy plants). Of these, 16 reported that they incorporated fresh, locally grown fruit in some of their juice products. These plants may be considered more a part of their local citrus industries than the citrus reprocessing industry. Less than a quarter (69 plants or 22%) of the dairies were located in these regions and there was no evidence that they employed local fruit rather than or in addition to concentrate.

In Canada both types of reprocessing plants are most densely concentrated in Ontario (62% of the nondairy and 42% of the dairy plants). By contrast, Quebec, with 27% of Canada's population, has only 3% of nondairy plants and 13% of the dairy plants.

Citrus Products

The 3 basic retail citrus juice forms are concentrate, chilled single strength, and canned single strength juice. Table 2 lists the number of plants reporting that they manufacture one or more of the above product forms. Some plants reported a combination of activities, for example—canning concentrate and single strength juice. These facilities were reported in each group. The repackaging and canning of single strength juice was largely limited, in the U.S. and Canada, to the nondairy plants. It would appear that as

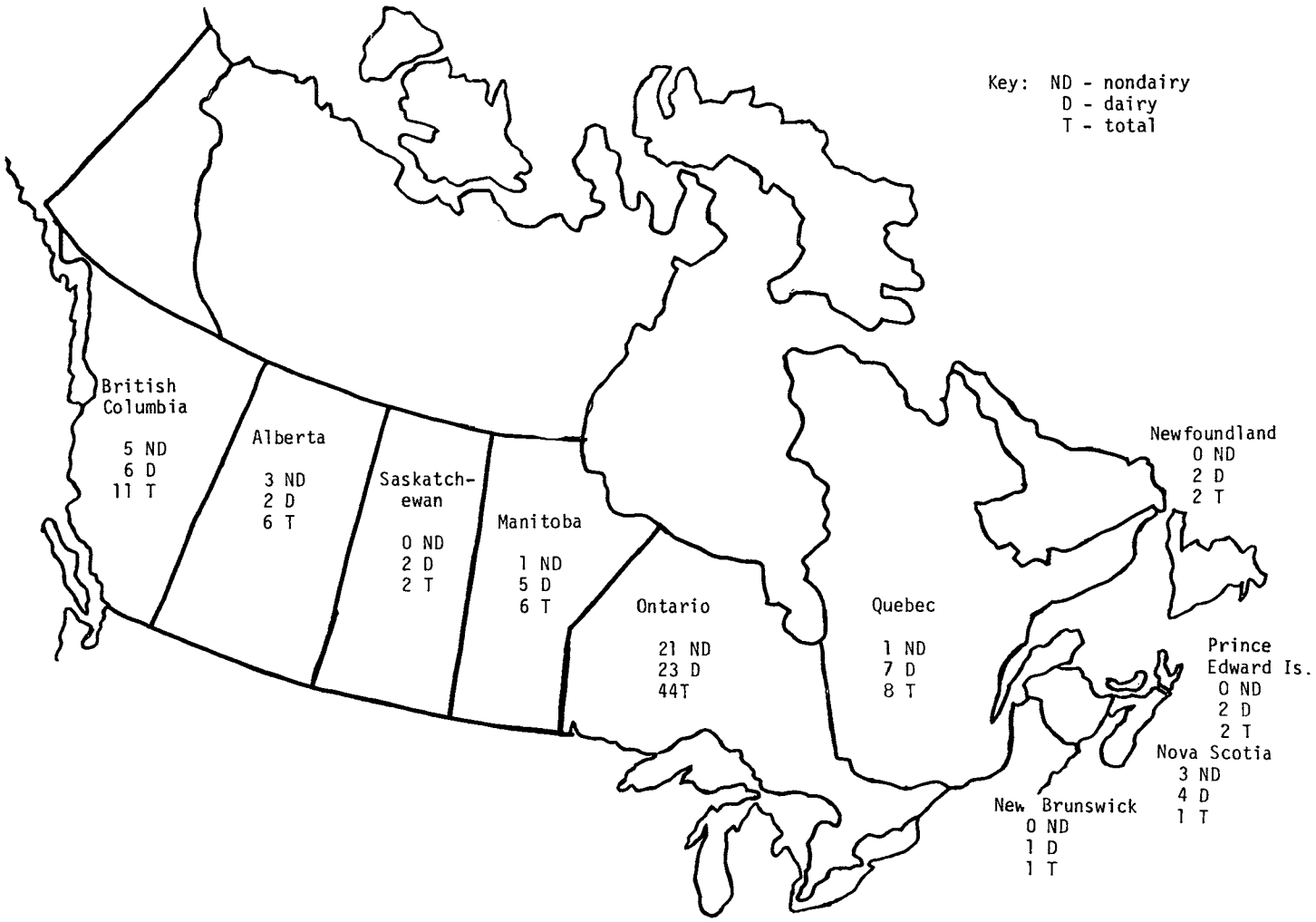

Fig. 1. Number of citrus reprocessing facilities in Canada.

dairies do not typically package milk products into metal containers, they are unwilling or unable to do so for citrus.

In the United States, producers of retail concentrate are clustered in the citrus producing regions—California, the West and South Central—where 61% of these plants are found. Likewise, 12 or 40% of the single strength canning plants are also found close to these citrus producing regions. Many of these plants are the ones which process from fruit as well as reprocess from concentrate.

The U.S. nondairy chilled juice reprocessors are most densely located in the Midwest, Middle Atlantic and New England regions, away from the citrus producing regions and closer to the U.S. population centers. Chilled juice production is the dominant citrus activity by dairies, with all but 6 of the 367 U.S. and Canadian citrus reprocessing dairies reporting production of chilled juice. No locational pattern was noted with respect to the production of citrus products by Canadian nondairy firms.

There are marked differences between U.S. and Canadian nondairy plants with respect to the frequency of production of the various citrus products. In particular, Canadian nondairy citrus reprocessing plants are more likely to produce canned juice and less likely to produce retail concentrate and chilled juice than are their U.S. counterparts.

Concentrate Supply Sources

Producers were asked to approximate the percent of their concentrate supplies from Florida, other U.S. sources, and offshore imports. The averages are presented in Table 3. As would be expected, Florida was most often named as the most important single source of bulk concentrate for U.S. plants, both dairy and nondairy. On average, the U.S. nondairies reported that 50% of the concentrate used was from Florida while the dairies reported using over 90% Florida concentrate. Florida is a more important source of concentrate in the 4 most eastern U.S. regions—New England, Middle Atlantic, Southeast and Midwest—than in the 4 westernmost regions—North Central, South Central, West and California. The 4 western regions used primarily concentrate from "other U.S. source"—California, Texas and Arizona.

Of some interest is the fact that U.S. dairies, regardless of location, on average reported a higher percentage of Florida concentrate than did nondairy plants. The U.S. nondairy plants located in the 4 eastern regions reported the highest average use of imported concentrate—9%. In all other locations and for dairy and nondairy plants 2% or less, on average, of all concentrate utilized was identified as imported. In some situations the respondents were uncertain as to the true origin of the concentrate and may have misidentified some imported concentrate as originating in Florida or vice-versa.

Canadians depend more heavily on non-U.S. sources of concentrate. The average Canadian nondairy plant reported receiving 84% of its concentrate from non-U.S. sources, such as Brazil. Of the remaining 16% of the concentrate used by the average Canadian nondairy plant, Florida supplied nearly 95%, or 15% of total concentrate used. Keeping in

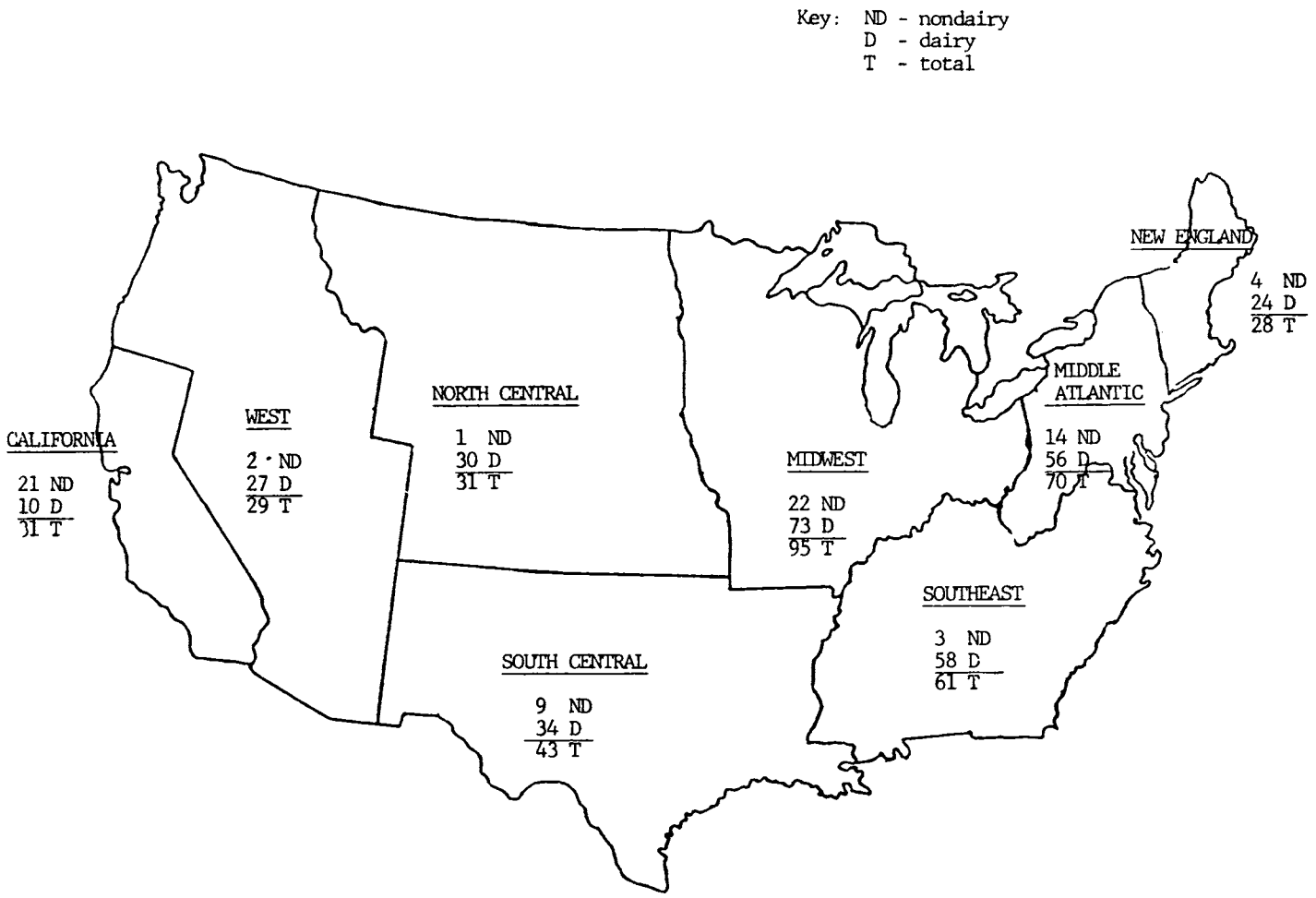

Fig. 2. Number of citrus reprocessing facilities in the continental U.S., excluding Florida.

step with the U.S. trend, Florida concentrate appears to be more important to Canadian dairies than to nondairies. Canadian dairies reported on average that 68% of their concentrate was of Florida origin. Like the Canadian nondairies, the majority of the remaining concentrate was supplied by non-U.S. sources.

There exists no simple explanation, nor data, to explain the sharp differences in reported concentrate sources between dairies and nondairies in both countries. But one possible reason may be that in many cases dairies do not have sufficient incentives to seek out alternative concentrate supplies and so choose to remain with the more established Florida suppliers. For most dairies, citrus reprocessing is a sideline activity. The average percent of total annual fluid production devoted to citrus reported by U.S. and Canadian dairies was 4.7% and 4.9%, respectively. In contrast, the U.S. and Canadian nondairy plants reported the mean percentage of total fluid production devoted to citrus production to be 44.9% and 38.2% respectively. If the U.S. plants which also process directly from fresh fruit are excluded, the average for U.S. nondairy firms drops to 35.5%—similar to the Canadian counterpart. Considering these differences in emphasis on ctrus production between dairies and nondairies it is not surprising that nondairy plants have been more active in establishing alternative supply sources.

Table 2. Number of plants producing citrus concentrate, chilled juice and canned juice, by plant type (percentages in parentheses).

Plant type	Citrus products		
	concentrate	chilled juice	canned juice
U.S. nondairy	23 (30%)[z]	46 (61%)	27 (36%)
U.S. dairy	3 (1%)	304 (97%)	3 (1%)
Canada-nondairy	4 (12%)	15 (44%)	24 (71%)
Canada-dairy	0 (0%)	55 (100%)	0 (0%)

[z]As some plants produce more than one category of citrus product, the percentages may not add to 100.

Table 3. Supply sources of concentrate used by U.S. and Canadian citrus reprocessors.

Plant type	Concentrate: % of all used by source		
	Florida	Other U. S.	Non-U.S.
U.S. nondairy			
East[z]	70	21	9
West[y]	18	80	2
Total	50	43	7
U.S. dairy			
East[z]	97	2	1
West[y]	75	23	2
Total	90	9	1
Canadian nondairy	15	1	84
Canadian dairy	68	4	28

[z]New England, Middle Atlantic, Southeast and Midwest.
[y]North Central, South Central, West and California.

Relative Importance of Each Plant Type

In pretesting, respondents were asked to describe their

annual fluid production in actual volumes. But it was quickly realized that managers were unwilling to answer such direct questions. To circumvent this problem ranges of probable total annual fluid production were created and respondents asked to identify the range into which their production fell. The ranges chosen were 0 to 9 million gallons, 9-18 million, 18-25 million, and greater than 25 million gallons of fluid production per year. A maximum of 45 million gallons was arbitrarily assigned as the upper range limit, except in a few cases for which more precise information was available and these estimates were used in place of the ranges. By multiplying the estimates for percent of total annual production devoted to citrus by the midpoint of the range for the total annual fluid production, crude estimates of citrus production were derived. Given the crudeness of these estimates, they are employed here to gauge the relative rather than the absolute levels of citrus juice production by nondairy and dairy plants. The reader must be cautioned that the validity of this procedure depends upon the absence of systematic differences in any biases which have resulted from this estimation process between the groups compared. As these authors cannot present arguments to support the thesis that there would be no systematic differences in any baises, these estimates should not be viewed as definitive.

Table 4 presents the estimated proportion of citrus production from U.S. dairies and nondairies. Dairies and nondairies in the 4 easternmost regions produce nearly equal proportions of the total reprocessed citrus juice production. Eastern dairies account for approximately 52% of the eastern production and nondairies for 48%—of course this is still excluding the production of Florida. In the 4 westernmost regions, by contrast, nondairy firms clearly dominate with almost 90% of the area's citrus production. However, only 26% of this total production is accounted for by plants which do not also process directly from fresh fruit. For the U.S. as a whole, all nondairy firms out-produce dairy firms by better than 2-to-1 (71% vs. 29% for nondairy and dairy, respectively). But once plants which process directly from fruit are excluded, nondairy and dairy plants produce approximately equal volumes.

Table 4. Estimated percent of citrus juice production by nondairy and dairy plants.

Plant type	Percent of total	Plant type	Percent of total
U.S. East			
Nondairy	48	Dairy	52
U.S. West			
Nondairy	89	Dairy	11
Nondairy[z]	26		
U.S. Total			
Nondairy	71	Dairy	29
Nondairy[z]	35		
Canad Total			
Nondairy	82	Dairy	18

[z]Nondairy plants excluding plants processing directly from fruit.

The Canadian situation is much more one sided. The nondairy plants clearly dominate, with an estimated 82% of the reprocessed citrus juice production.

Plants Handling Prepackaged Citrus Products

A large number of plants were found to market prepackaged retail citrus products. In addition to the numerous plants which were found to reprocess some citrus production and market some other prepackaged products (often grapefruit juices) there were 328 plants which did no reprocessing but which marketed retail-ready citrus products. A special survey was conducted to determine the characteristics of those plants which chose to handle but not to reprocess citrus products. A random sample of 64 U.S. dairy plants was taken. U.S. dairies comprised 92% of the reported handlers, so it seemed appropriate that they should be the foundation for this special survey.

With respect to the plant characteristics, few differences between dairy handlers and dairy reprocessors were noted. Not surprisingly, however, the dairies which reported handling citrus were less likely than dairy citrus reprocessors not to produce other nondairy products, such as grape or apple juice. Of the citrus reprocessing dairies, 49% reported also reprocessing apple juice, 15% grape juice, and 10% cranberry juice. Of the dairies which handle, but do not reprocess citrus, only 17% reported reconstituting apple juice, 7% grape juice, and 3% cranberry juice.

On average, 91% of the prepackaged citrus products were identified as coming from the same state and, in general, from a plant belonging to the same corporate entity. Only an average of 4% was identified as being from Florida. Moreover, when questioned about the reasons for not reprocessing, 70% of the firms responded that this function had been assigned to an associated plant within the state. Only 27% of the firms cited Florida's superior reputation as an impediment to in-house reprocessing.

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