Supply and Disposition of Cool Season Grass Seed in U. S. and Overseas Markets

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SUMMARY

This document is one of a series of research reports, sponsored by the Oregon Agricultural Experiment Station, which focuses upon issues associated with Oregon's Willamette Valley grass seed industry. This report deals specifically with production and market forces which affect the supply of and demand for cool season grass seed. Provided is a descriptive compilation of statistical data on trends and changes in the grass seed industry over the last 20 years. Secondary data from available published sources are used.

ACKNOWLEDGMENTS

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SUPPLY AND DISPOSITION OF COOL SEASON GRASS SEED IN U.S. AND OVERSEAS MARKETS

W. Robert Wilson and Frank S. Conklin

INTRODUCTION

Production, processing, and marketing of cool season grasses are of considerable economic importance within the agricultural sector of Oregon's economy. Grass seed production generated $59 million in Oregon farm receipts in 1978, representing 9 percent of the State's value of crop sales [11]. Grass seed processing and marketing contributed an estimated additional $8 million to the State's economy [6]. Labor, machinery, and other purchased inputs required for grass seed production provide an additional but unmeasured contribution to the economy. The Willamette Valley (Figure 1) is the dominant grass seed producing region in Oregon, accounting for $50 million, or 85 percent of total within-state revenues from grass seed production. Such income represents about 15 percent of crop derived revenue in the Willamette Valley [11].

The Willamette Valley produces all eight of the world's major cool season grass seeds, which include annual ryegrass, perennial ryegrass, orchardgrass, tall fescue, bentgrass, fine fescue (chewings and red), Merion Kentucky bluegrass, and other Kentucky bluegrass. For the last 20 years, Willamette Valley production has accounted for 60 to 80 percent of U.S. production of cool season grasses (Figure 5 and Appendix Table 2). U.S. and Denmark share dominance in volume of cool season grasses marketed internationally.

The purpose of this report is to provide an industry-level overview of the production, processing, and marketing of cool season grasses utilizing secondary data from available published sources. While emphasis is on the Willamette Valley, discussion also includes Oregon, the U.S., and world markets to the extent the data will permit. While discussion is largely descriptive, some quantitative analysis, in graphic form, is presented to highlight trends and annual variation.

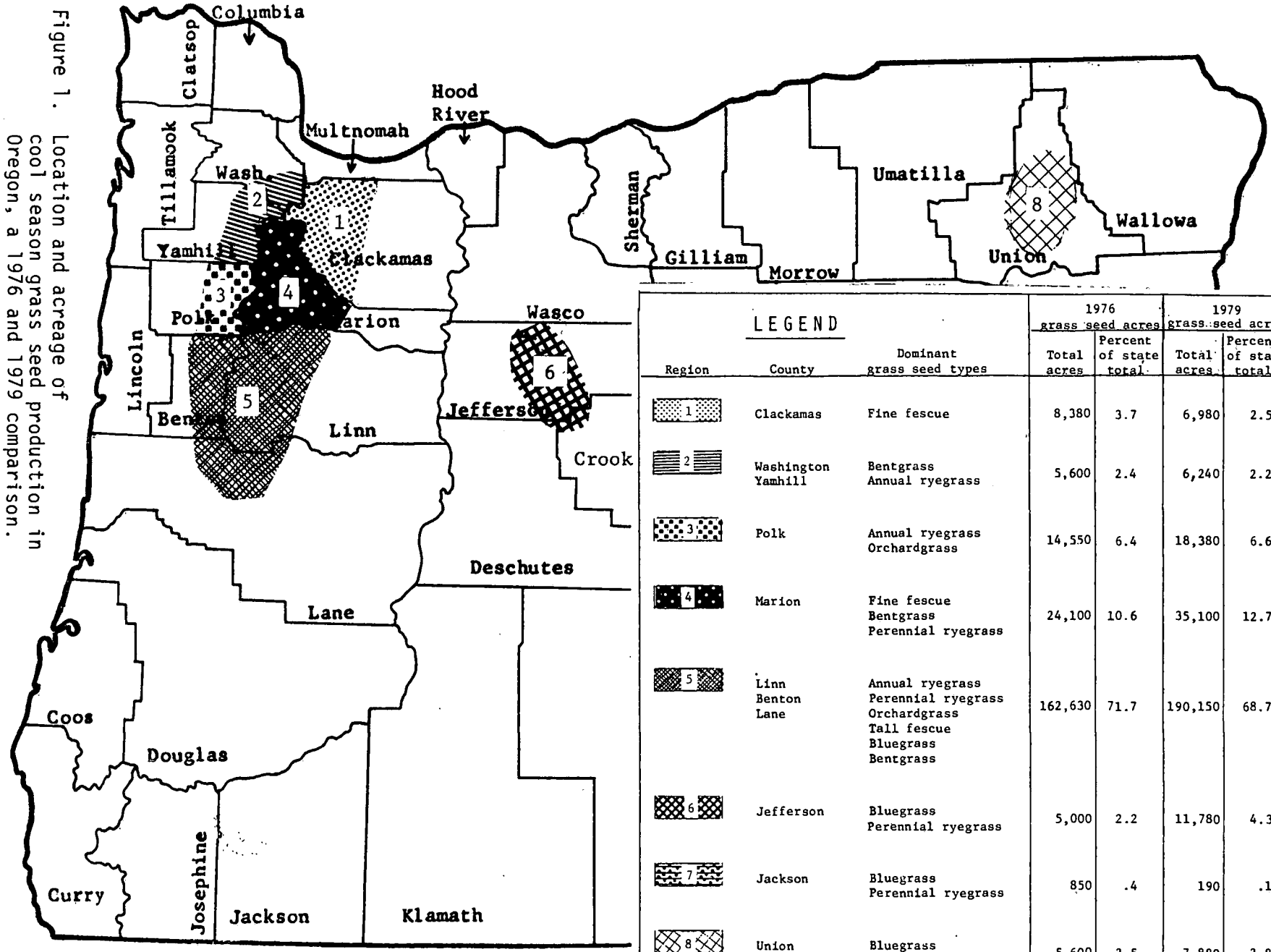

Figure 1. Location and acreage of cool season grass seed production in Oregon, a 1976 and 1979 comparison.

LEGEND

Region	County	Dominant grass seed types	1976 grass seed acres: Total acres	1976 grass seed acres: Percent of state total	1979 grass seed acres: Total acres	1979 grass seed acres: Percent of state total
1	Clackamas	Fine fescue	8,380	3.7	6,980	2.5
2	Washington Yamhill	Bentgrass Annual ryegrass	5,600	2.4	6,240	2.2
3	Polk	Annual ryegrass Orchardgrass	14,550	6.4	18,380	6.6
4	Marion	Fine fescue Bentgrass Perennial ryegrass	24,100	10.6	35,100	12.7
5	Linn Benton Lane	Annual ryegrass Perennial ryegrass Orchardgrass Tall fescue Bluegrass Bentgrass	162,630	71.7	190,150	68.7
6	Jefferson	Bluegrass Perennial ryegrass	5,000	2.2	11,780	4.3
7	Jackson	Bluegrass Perennial ryegrass	850	.4	190	.1
8	Union	Bluegrass Fine fescues	5,600	2.5	7,880	2.8
Other	--	--	140	.1	100	.1
TOTAL			226,850	100.0	276,800	100.0

The information presented is intended to (1) draw together into one source document all of the known data associated with production and marketing of cool season grass seed, and (2) to provide a degree of interpretation of the production and marketing of such grass seed on an industry-wide basis. In serving such objectives, this report is intended as a reference source for producers, processors, legislators, researchers, extension agents, and the general public concerned with Oregon's grass seed industry.

DATA AND DATA SOURCES

Production

U.S. production of cool season grass seed is reported annually by the Statistical Reporting Service, USDA, in Seed Crops [12]. Such data series is available for reporting years 1958 through 1979, and presented in tabular form in Appendix Table 1.

Oregon production of cool season grass seed is compiled from two sources: the Oregon State University Extension Service, and the Oregon Crop and Livestock Reporting Service, ESS, USDA, in Portland. The Crop and Livestock Reporting Service uses an area enumeration seed cleaner report; each county office of the Extension Service obtains estimates of county production, acreage, and yields from a variety of sources using various procedures. Discrepancies between the two data sources are resolved jointly by the two agencies, and reported as a single data set in Seed Crops [12]. Oregon production for the 1958-1979 period is presented in Appendix Table 2. Willamette Valley production is reported separately in Appendix Table 3. Acreage and yield components of Willamette Valley production are reported in Appendix Tables 4 and 5. Within-state data are not reported in Seed Crops, but maintained in unpublished form in the Office of Economic Information, Department of Agricultural and Resource Economics, Oregon State University [10].

Recorded information on world production of cool season grass seed, other than U.S. and Canada, is meager. It is well-known in the seed trade that several countries in the European Economic Community (EEC), as well as Australia and New Zealand, produce cool season grasses for seed. The dominant producer outside the U.S. is Denmark, which also is the only international competitor from which reliable data on production can be obtained. Danish production for the 1959-1978 period is presented in Appendix Table 6. The data are reported by the Office of the Agricultural Attache, Foreign Agricultural Service, USDA, U.S. Embassy, Copenhagen, Denmark, using reported agricultural statistics from the Danish government [15].

Canada is a large producer of creeping red fescue in Alberta and British Columbia provinces. Such production is reported by the Production and

Marketing Branch, Plant Products Division, Canada Department of Agriculture (CDA), Ottawa, in the annual Final Seed Crops Report [4]. Canadian production is not reported in this document since export levels to the U.S. are not provided.

Stocks

Grass seed is a relatively durable commodity which can be stored for a substantial period of time without major qualitative deterioration. Grass seed is stored both at farm and wholesale (processing by first handler) levels. Stocks of grass seed held in the U.S., both by farmers and wholesalers are reported by the Seed World and Seed Crops, monthly and annual summaries. The Seed World is a seed trade magazine which uses Seed Crops as its primary data source. Stocks are obtained from the area enumeration seed cleaner report conducted by the Crop and Livestock Reporting Service in each state referred to earlier. The U.S. annual stocks time series for the 1959-1979 period is presented in Appendix Table 7 at the farm level, and Appendix Table 8 for the wholesale level.

Exports and Imports

Grass seed quantities exported from, and imported to, the U.S. are substantial. Exports expressed by quantity, value, and destination are reported in Seeds, Field and Vegetable, a Foreign Agriculture Service circular published monthly by USDA [14]. This source, until 1978, did not separate fine fescue from tall fescue. Oregon grass seed wholesalers reported that fescues exported to South America, Japan, Africa, and Mexico were almost exclusively tall fescue for forage production, and fescues exported to Canada, Australia, and Europe were principally fine fescue for turf production. Since grass seed exports reported by the Foreign Agricultural Service are by country of destination, separation by country formed a simple means for differentiating quantities of tall fescue and fine fescue marketed in international channels. Export time series for the 1959-1979 period is presented in Appendix Table 9. Reports on monthly and annual imports of agricultural seeds admitted into the U.S. under the Federal Seed Act are prepared by the Agricultural Marketing Service, Grain Division Seed Branch, USDA, Washington, D.C. Such imports and exports are reported both in Seed

World and Seed Crops. The time series for grass seed imports for the 1959-1979 period are presented in Appendix Table 10.

International marketings of cool season grasses are reported only by the U.S. Consequently, it is not possible to determine the total volume of grass seed traded internationally.

Consumption

U.S. consumption of cool season grass seed is not reported at the retail level. However, it is estimated as a residual both in the USDA report, Seed Crops, and in this document. This is accomplished by starting with the volume of stocks carried in from the previous year by U.S. farmers and wholesalers (Appendix Tables 7 and 8), adding to it the quantity produced in the U.S. in a given year (Appendix Table 1), adding the quantities imported into the United States in that year (Appendix Table 10), subtracting the quantities exported from the United States in that year (Appendix Table 9), and subtracting the stocks on hand at the end of the year by farmers and dealers (Appendix Tables 7 and 8). The result is a calculated estimate of the total annual consumption of cool season grass seed in the United States. Time series consumption of cool season grass seed for the 1959-1978 period is presented in Appendix Table 11.

Prices

Farm gate price received by Oregon producers is compiled jointly by the Oregon Crop and Livestock Reporting Service, ESS, USDA, and the Oregon State University Extension Service, in the same manner as Oregon production referred to earlier. State level prices are reported in Seed Crops. Average annual county prices in Oregon are available, in unpublished form, from the Economics Information Office, Department of Agricultural and Resource Economics, Oregon State University. Oregon farm gate prices for each of the eight cool season grass seed types for the 1957-1979 period are presented in Appendix Table 12.

Prices paid at the retail level by U.S. consumers are reported only for four grass seed types (orchardgrass, tall fescue, all Kentucky blue-

grass, and annual ryegrass) sold in agricultural supply houses which provide grass seed for farmer spring plantings of pasture. Retail prices in supermarkets, chain stores, etc., supplying grass seed for urban buyers and golf courses, are not reported. Consequently, data for the four grass seed types must be used with caution as they are limited in scope. The time series from 1967 to 1979 for retail prices paid by farmers for field seed reported on April 15, is compiled by the Crop Reporting Board, ESS, USDA, Washington, D.C., and reported in Agricultural Prices [12]. Such time series is presented sented in Appendix Table 14.

Since retail price time series is incomplete and represents but a small portion of the total retail market for grass seeds, wholesale prices paid to Oregon seed wholesalers represent the first handler level in the grass seed marketing sequence. Several wholesalers provided independent unpublished price information, which in turn was averaged to protect the identity of each handler. The adjusted wholesale prices were modified further by processing firms which did not contribute price data. This provided an additional cross-check in attempting to assure that the price series generated in this manner reflect reasonably well the wholesale prices received by the grass seed industry. The estimated average annual price received by Oregon seed wholesalers for cool season grass seed is for 1958-1976 is presented in Appendix Table 13.

Quantity and value of export information is provided by the Department of Commerce for many commodities, including cool season grass seed. Unfortunately, the data are not adjusted for transportation charges incurred from production site to port of embarkation, where value of product is calculated. Because transportation charges are not available, export prices could not be calculated.

PRODUCTION AREAS

International

A number of countries, in addition to the U.S., produce cool season grass seed. The principal ones include Canada, the EEC countries (Denmark, France, Germany, Belgium, and the Netherlands), Australia, New Zealand, and Sweden. Historically, Denmark and the U.S. have been the principal suppliers in international grass seed markets. Export data on grass seeds by country of origin are not available except for the U.S. and Denmark. Danish production of cool season grass seed is shown in Appendix Table 6.

Danish production of fine fescue is highly variable between years and sometimes exceeds that of the U.S. Danish production of orchardgrass and bluegrass is about one-third of U.S. levels. Denmark also produces small amounts of tall fescue, annual ryegrass, and perennial ryegrass. Denmark's membership in the EEC affords it first source of supply rights among EEC member countries. With the exception of fine fescue, the U.S. generally is residual supplier of cool season grass seed, i.e., supplying grass seed in years when Denmark's production is not adequate to meet EEC demand. EEC governmental policies of producer subsidies and non-tariff (quality) import controls serve to encourage agricultural production within the EEC countries and discourage grass seed imports from the U.S. except in years of low EEC production and low world stocks. Fine fescue is a special case. Danish creeping red fescue is generally lower quality uncertified fescue which does not meet the EEC standards which the U.S. certified fine fescues satisfy. In this case Denmark and Canada are residual suppliers.

Canada is a large producer of creeping red fescue in the provinces of Alberta and British Columbia. Apparently, most of such production is exported to the U.S. New Zealand is entering the international grass seed market with production of annual and perennial ryegrasses. Their volume of export, while unknown, appears historically to have been small.

United States

Within the United States, Oregon usually is the sole producer of fine

fescues (chewings and red), bentgrass, annual ryegrass, and perennial ryegrass (Figure 5). In addition, Oregon is producing an increasing proportion of the domestic supply of orchardgrass seed, ranging from 70 to 80 percent since 1972. Virginia and Missouri supply the major residual share of orchardgrass seed. Half the Merion Kentucky bluegrass seed and 30 to 50 percent of the U.S.-produced other Kentucky bluegrass seed is produced in Oregon. Idaho and Washington produce the remaining 50 percent of domestic Merion Kentucky bluegrass, and 50 to 70 percent of other Kentucky bluegrass seed. The only cool season grass seed in which Oregon is not a dominant producer is tall fescue. Oregon supplies less than 5 percent of U.S. production of tall fescue. The cultivation of tall fescue grass is centered in the Midwestern and southern United States, with Missouri producing nearly 80 percent of U.S. production.

Oregon

The Willamette Valley is the major grass seed producing region in Oregon and contributes consistently more than 90 percent of Oregon's grass seed production [7,9]. About 7 to 8 percent of state acreage occurs outside the Valley in Jackson, Union, and Jefferson Counties (Figure 1). Proprietary variety production of perennial ryegrass and bluegrass dominates production in the non-Valley areas.

The rather unique climatic conditions of the Willamette Valley afford it several advantages in the production of grass seed. Moist and mild weather conditions during fall, winter, and spring prompt plant growth and development, and the generally dry summer months permit maturation and timely harvest of a consistently high quality seed crop [8]. Linn, Benton, Lane, and Polk Counties contribute nearly 70 percent of total Valley acreage and production.

MARKET FORCES

Market Uses

The grass seed trade classifies cool season grasses into three consumer use categories. Such consumer use division of the eight major grass seed types is as follows:

Lawn and turf use

- Fine fescues (chewings and red)
- Bentgrass
- Other Kentucky bluegrass
- Merion Kentucky bluegrass

Cover-crop and pasture use

- Orchardgrass
- Tall fescue

Multi-purpose use

- Annual ryegrass
- Perennial ryegrass

Cool season lawn and turf grasses provide the special characteristics of easy mowing, tolerance to low cutting levels, vigorous growth of dense coverage, rich green appearance, and responsiveness to irrigation and fertilization. Such characteristics foster a strong homeowner and golf course use appeal. Data which specify major market locations for lawn and turf purposes are not available. However, such locations are expected to coincide generally with areas of urban expansion in the U.S. where consumer preference is for acquisition of homes outside the central city core area, exclusive of the southern tier of U.S. states where very high summer temperatures occur requiring warm season grasses for lawn purposes.

The pasture use grasses generally are combined with legumes and other grass seeds in a pasture mix which is seeded and ultimately grazed by livestock. A major market for such grass seeds is in the southeastern United States where pastures and covercrop operations support a large grass fattening livestock industry.

Annual and perennial ryegrasses are classified as multipurpose grasses. They are used both in the lawn-turf and pasture-covercrop markets. The ryegrasses dominate both markets in terms of volume. The reasons for this are both economic and technical. Most grass seeds are sold at retail in mixed, rather than pure, form. The ryegrasses dominate seed mixes because (1) their price is low relative to other seed types, and (2) their growth characteristics generally include earlier germination, more rapid growth, and a more luxuriant initial groundcover than other grass and legume seed types. The proportion of other seed types added to the ryegrass base varies directly with the price of ryegrass seed. The lower the price of ryegrass, the lower is the proportion of other seed types in the mix. Conversely, when the price of ryegrass is high, relative to other seed types, the proportion of other seed types in the mix is high. Annual ryegrass also is sold in pure form in the southwestern U.S. for annual seeding of winter lawns.

Until 1970, most foundation seed used in improving plant species was propagated and distributed through public breeding programs conducted by land grant universities and the USDA. Passage of the Plant Variety Protection Act, Public Law 91-577, on December 24, 1970, provided proprietary protection via patent rights to private and public breeders. These rights provide for exclusive propagation and sale of grass seeds under private varietal labels in both domestic and foreign markets for 17 years. Many private seed companies in the United States now contract production of proprietary varieties with producers. Proprietary varieties are being promoted vigorously both in the United States and Europe. However, in Europe, seed certification and other quality requirements appear to be contributing to a more rapid

However, in Europe seed certification and other quality requirements appear to be contributing to a more rapid shift in emphasis upon proprietary varieties. The extent to which proprietary varieties provide a real or perceived difference to consumers in desired production characteristics from that found in public varieties in the U.S., along with relative market price differentials between proprietary and public varieties, is expected to be a major determinant of the market proportions captured by proprietary varieties. The impact of such trends is difficult to assess with grass seed since the available public data reported in Seed Crops did not begin reporting public and proprietary varieties separately within a seed type until the 1970s. For Kentucky bluegrass such separate reporting was initiated in 1975 followed in 1979 with perennial ryegrass.

Such separate reporting has not yet been initiated for the other major grass seed types because of low volume. Unfortunately, the reporting for Kentucky bluegrass is confused by the inclusion of Merion Kentucky bluegrass with the proprietary varieties when it is in fact a public variety. The trade itself played a role in maintaining the current reporting division [2].

The Seed Certification Office at Oregon State University estimated that, proprietary varieties in 1973 accounted for 22,000 to 30,000 acres of cool season grass seed in the Willamette Valley. By 1979, seed certification records reported that between 65,000 and 75,000 acres of grass seed in the Willamette Valley were of proprietary varieties, dominated by perennial ryegrass [3]. The dominant proprietary varieties of perennial ryegrass are Pennfine, Manhattan, and Derby; for fine fescue Highlight, Koket, and Barfalla; for Kentucky bluegrass, Baron, Bonnie Blue, and Majestic.

International regulations also are important to Oregon producers of grass seed, especially to those whose seed is destined for international markets. In 1960, Oregon and other states in the U.S. agreed to participate in an international certification system for herbage and oil seed moving in international trade. This program was initiated by the Organization for Economic Cooperation and Development (OECD) whose basic objective was to encourage freer trade among the member nations which was dominated by the European Economic Community (EEC). In 1964, there were 458 acres certified under the OECD program in Oregon. By 1979, 27,506 acres in Oregon were eligible for OECD production.

Supply and Disposition in U.S. Markets

Total supply of grass seed available for U.S. markets comes from annual U.S. production and U.S. import sources. Such components of supply are presented graphically in Figure 2 for the 21-year period from 1958 through 1978. The data are compiled from Appendix Table 15. Four grass seed type components are shown: (1) the combined total supply of the eight grass seed types, (2) the supply of multipurpose grasses (annual and perennial ryegrasses, (3) the supply of lawn- and turf-type grasses (fine fescue, bentgrass, and bluegrasses), and (4) the supply of pasture and covercrop grasses (orchardgrass and tall fescue).

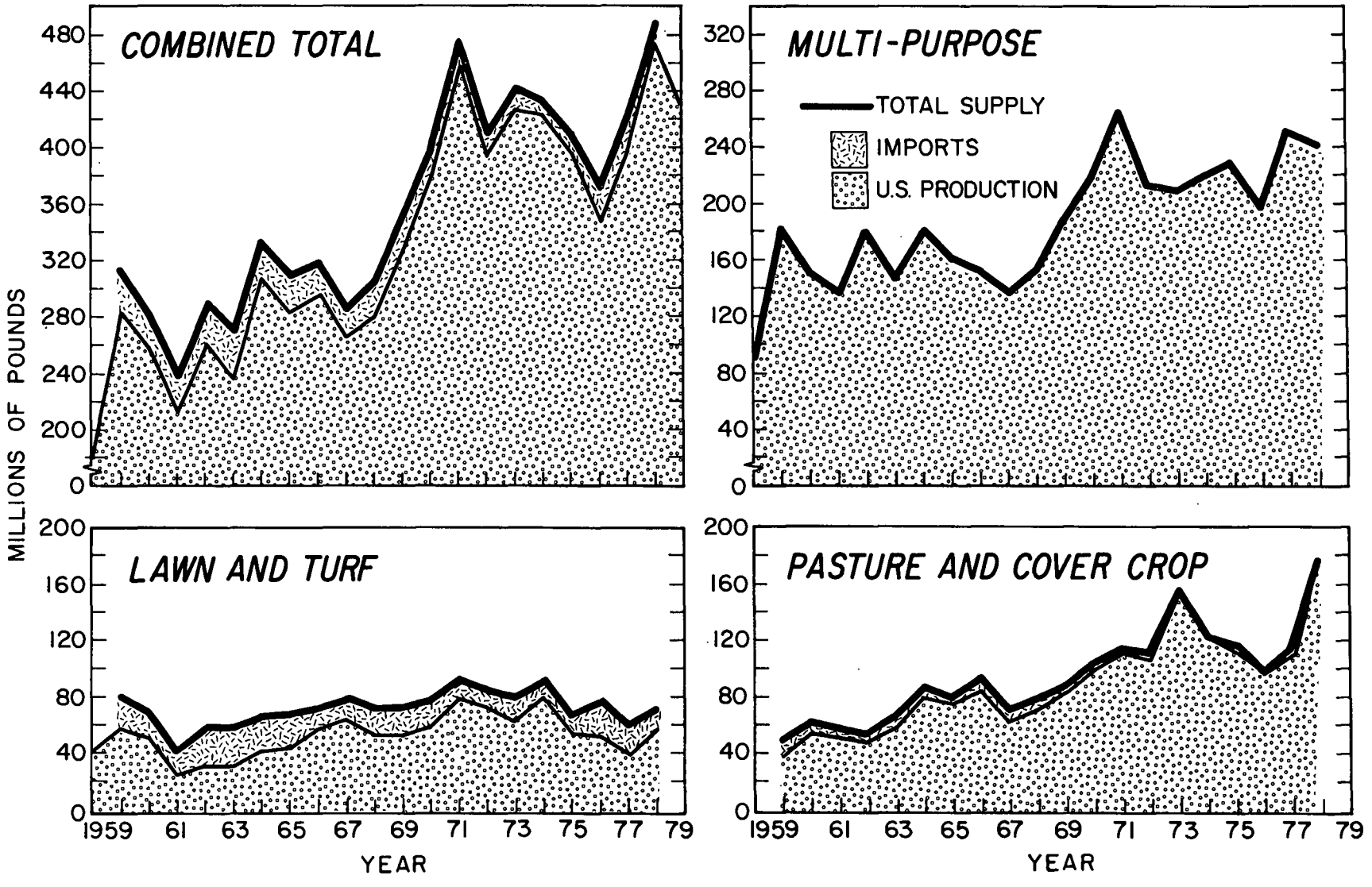

Figure 2. Supply (U.S. production plus imports) of cool season grass seed in U.S. markets by consumer use class, 1959-1978.

Total supply is dominated by U.S. production. Since the late 1960s, imports to the U.S. have accounted for only 3 to 7 percent of total supply. There are essentially no imports of multipurpose grass seeds. Since 1973, a negligible quantity of pasture and covercrop grass seeds has been imported. Imports of lawn and turf grass seeds, largely of proprietary varieties, are an important component, accounting for 12 to 33 percent of total supply. Import volumes tend to increase following years of low U.S. production and decrease following years of high production. Red fescue from Canada is the dominant import.

Disposition of the total supply of grass seed available in U.S. markets involves seed utilized in the retail market by consumers' purchases and seed exported for sale and used in foreign markets. Disposition to total supply is presented graphically, for the 21-year period from 1959 to 1978, in Figure 3. The data are compiled from Appendix Table 16. Separate graphs show all cool season grass seeds collectively, as well as multipurpose, lawn-turf, and pasture-covercrop consumer use categories. The total disposition of grass seed has increased steadily over the last two decades, from a low of 252 million pounds in 1961 to a high of more than 477 million pounds in 1978. Major increases are from multipurpose and pasture covercrop consumer use categories. Disposition is dominated by U.S. consumption for each consumer use class. Exports account for only 9 to 15 percent of combined total disposition, and as little as zero to 14 percent of multipurpose and pasture and covercrop consumer use classes. Exports for the lawn and turf consumer use class are more important, ranging from 10 to 45 percent of total disposition for that class.

Grass seed not utilized from total supply by U.S. consumer purchases and exports is retained as farmer/wholesaler stocks. Such retention may result in larger or smaller stock levels over time, depending upon market conditions expressed as market prices which equilibrate supply with demand at any moment in time. Stocks of grass seed held by farmers and wholesalers are presented graphically in Figure 4 for the 21-year period from 1959 through 1979. Separate graphs present the combined total as well as multipurpose, lawn-turf, and pasture-covercrop consumer use categories. Most of a year's crop production is harvested in August and September. Some multi-purpose and lawn-turf grasses are shipped in the early fall to meet market demand for fall seeded permanent lawn establishment in various locations throughout the

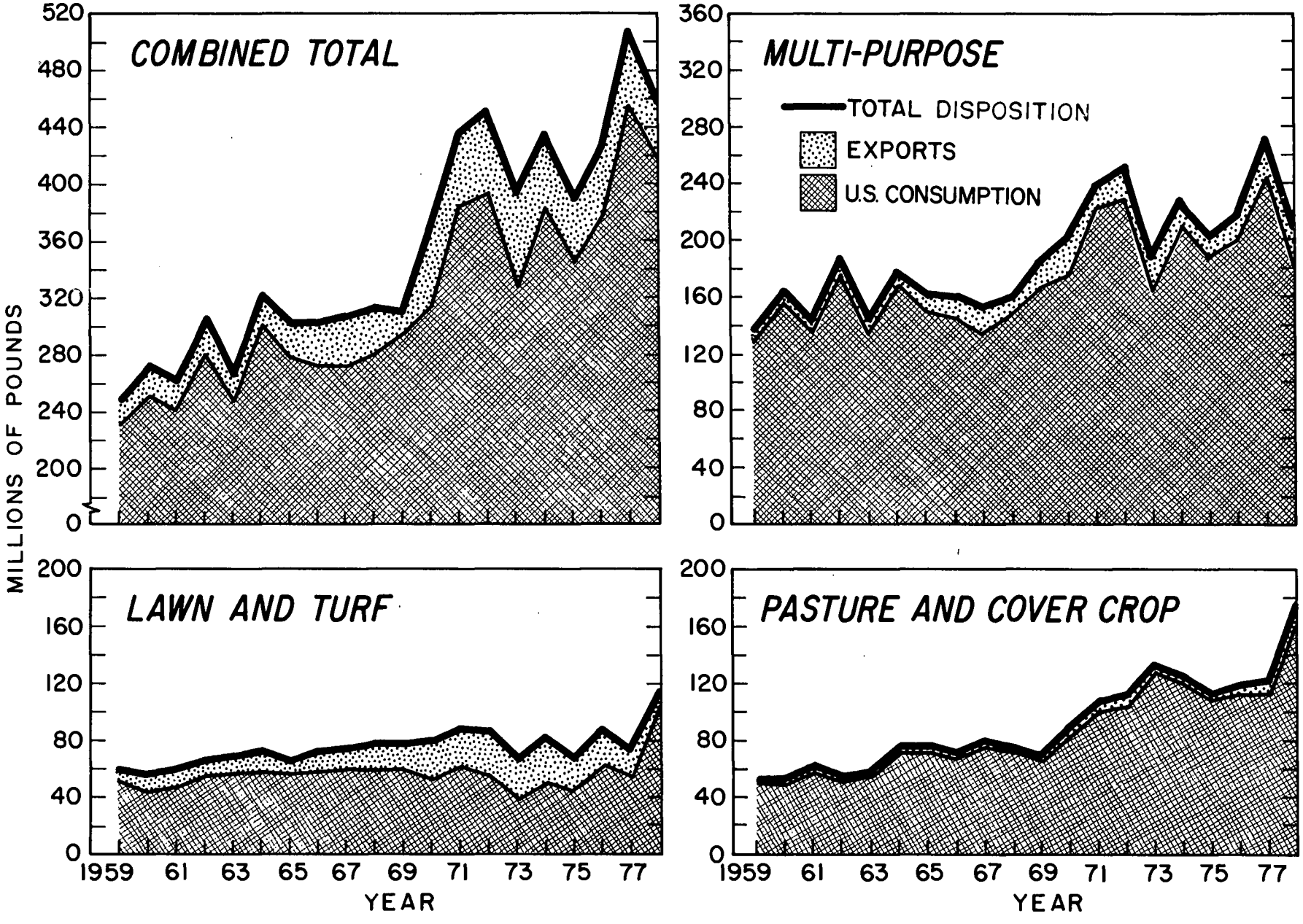

Figure 3. Disposition (U.S. consumption plus exports) of cool season grass seed in U.S. markets by consumer use class, 1959-1978.

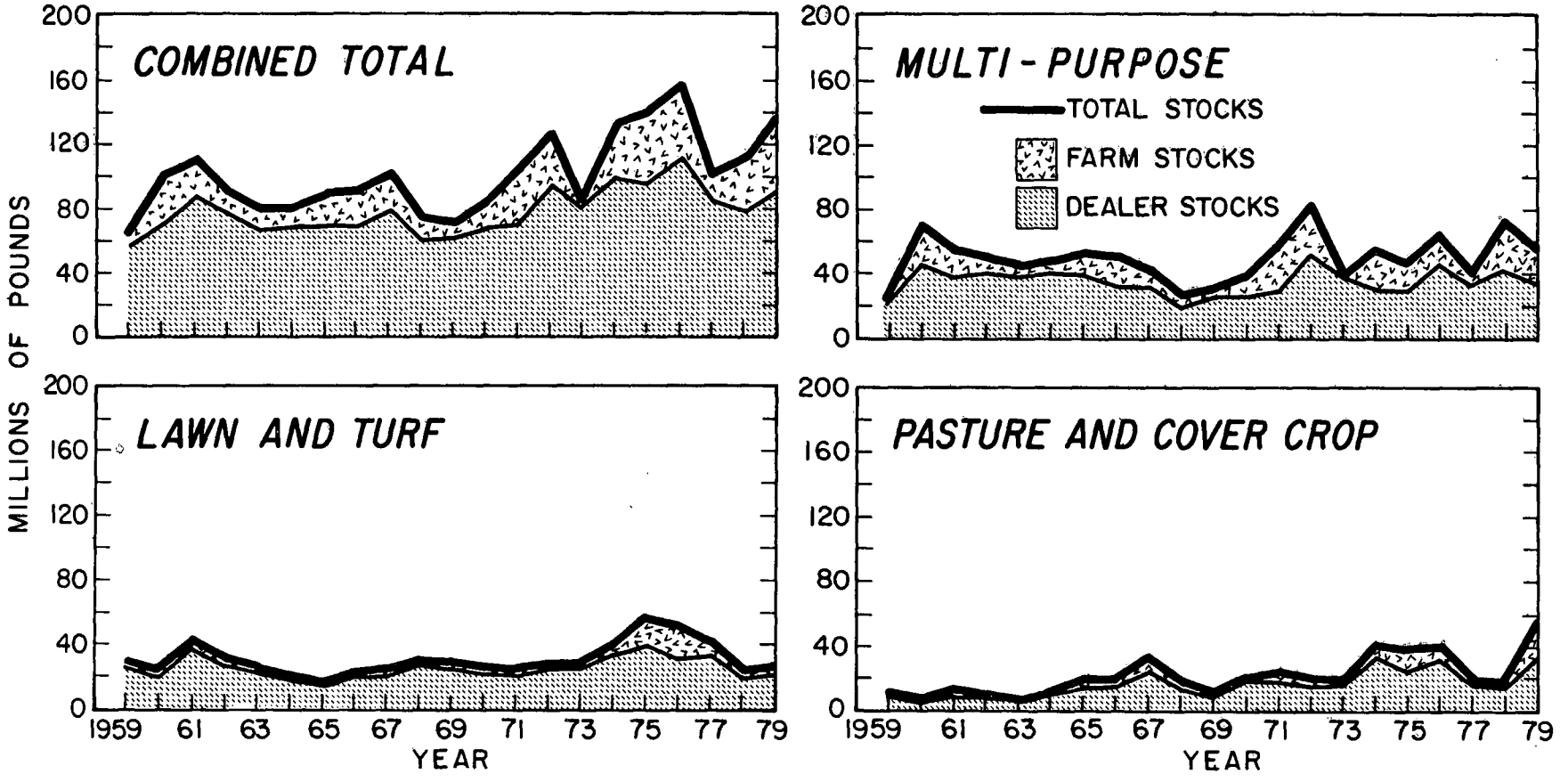

Figure 4. U.S. stocks of cool season grass seed held by farmers and wholesalers by consumer use class, 1959-1979.

U.S. Annual ryegrass comes into market channels in the fall and winter months to meet demands for annual overseeding of parks, cemeteries, golf courses, and home lawns in the southeastern and southwestern U.S. In such hot climates, the grass species are typified by zoysia, bermuda and St. Augustine grass which make fine summer lawns with irrigation. In winter, such species become dormant and brown in color. Annual ryegrass planted directly into the dead grass residue cover (overseeding) produces a beautiful green lawn during the winter and early spring months.

Comparison of annual U.S. consumption (Figure 3) with U.S. production (Figure 2) shows slightly less seasonal variation with consumption. For the 1959-1968 decade, U.S. consumption varied less than 70 million pounds, from low to high, while U.S. production in that same time period varied 92 million pounds, from low to high. For the 1969-1978 decade, U.S. consumption varied 150 million pounds, and U.S. production varied 168 million pounds, from low to high. Changing the stock, export, and import levels of grass seed in storage, principally by wholesalers, serves as a buffer between supply and demand, thereby dampening, to some extent, the seasonal market price fluctuations. The basic trend in total market volume has been one of increasing domestic consumption and exports, both in relative and absolute terms. During the early 1970s, domestic consumption of lawn and turf grass seeds had decreased in total volume, but in the late 1970s, exceeded previous record levels. The downturn in domestic consumption was accompanied by an increase in volume of export that was more than offsetting. Domestic consumption of covercrop-pasture use seed more than doubled over the study period, with the U.S. moving from net importer to a net exporter of such grass seed. Domestic consumption of multipurpose grass seed (annual and perennial ryegrass) has increased substantially, and the volume of exports has doubled over the study period.

The bulk of domestic storage capacity for grass seed is provided by wholesalers. At no time over the last two decades have farmer stocks accounted for more than one-third of total U.S. grass seed volume in storage. The combined farmer and wholesaler stocks have ranged between 25 and 50 percent of annual production (Appendix Table 8). Greater relative variability in annual inventory levels exists at the farm level than with the wholesale because of (1) smaller absolute storage capacity, and (2) greater flexibility for timing of rates on the basis of market price especially with public varieties. Local whole-

salers, on the other hand, are committed to deliver to other processors or retailers the seed they buy from farmers.

Components of U.S. Supply

U.S. supply of grass seed is made up of U.S. production, foreign imports, and net additions/deletions from farmer/dealer carryover stocks.

U.S. Production

Production of cool season grass seeds for the U.S., Oregon, and the Willamette Valley is presented in graphic form by separate seed type and combined total for five-year average production periods in Figure 5.

U.S. production of cool season grass seeds increased steadily from a level of 183 million pounds in 1958 to a high of 444 million pounds annually in 1971. The mid-1970s saw some decline from the 1971 level, followed by a record production of 487 million pounds in 1978. Significant production increases of tall fescue seed in Missouri and annual ryegrass in the Willamette Valley contributed to the record 1978 production. The Willamette Valley consistently produces 55 to 73 percent of total U.S. cool season grass seed production, thus dominating U.S. production in a collective sense.

Oregon production of cool season grass seed, during the decade from 1959 through 1968, varied within the range of 162 to 225 million pounds per year. From 1969 through 1979, production ranged from 241 to 335 million pounds, representing nearly 100 million pounds per year higher production for the 1970s over the 1960s.

Oregon production is dominated by the Willamette Valley, which consistently contributes more than 95 percent of Oregon's production. Small amounts of Oregon production occur in southern Oregon's Jackson County, and in the irrigated areas of eastern Oregon in Jefferson, Crook and Union Counties. Nearly all regional production shifts have come since 1973, with an increase in proprietary variety production of Kentucky bluegrass and perennial ryegrass in the irrigated regions of eastern Oregon, Washington, and Idaho, and comparable reduction in the Willamette Valley.

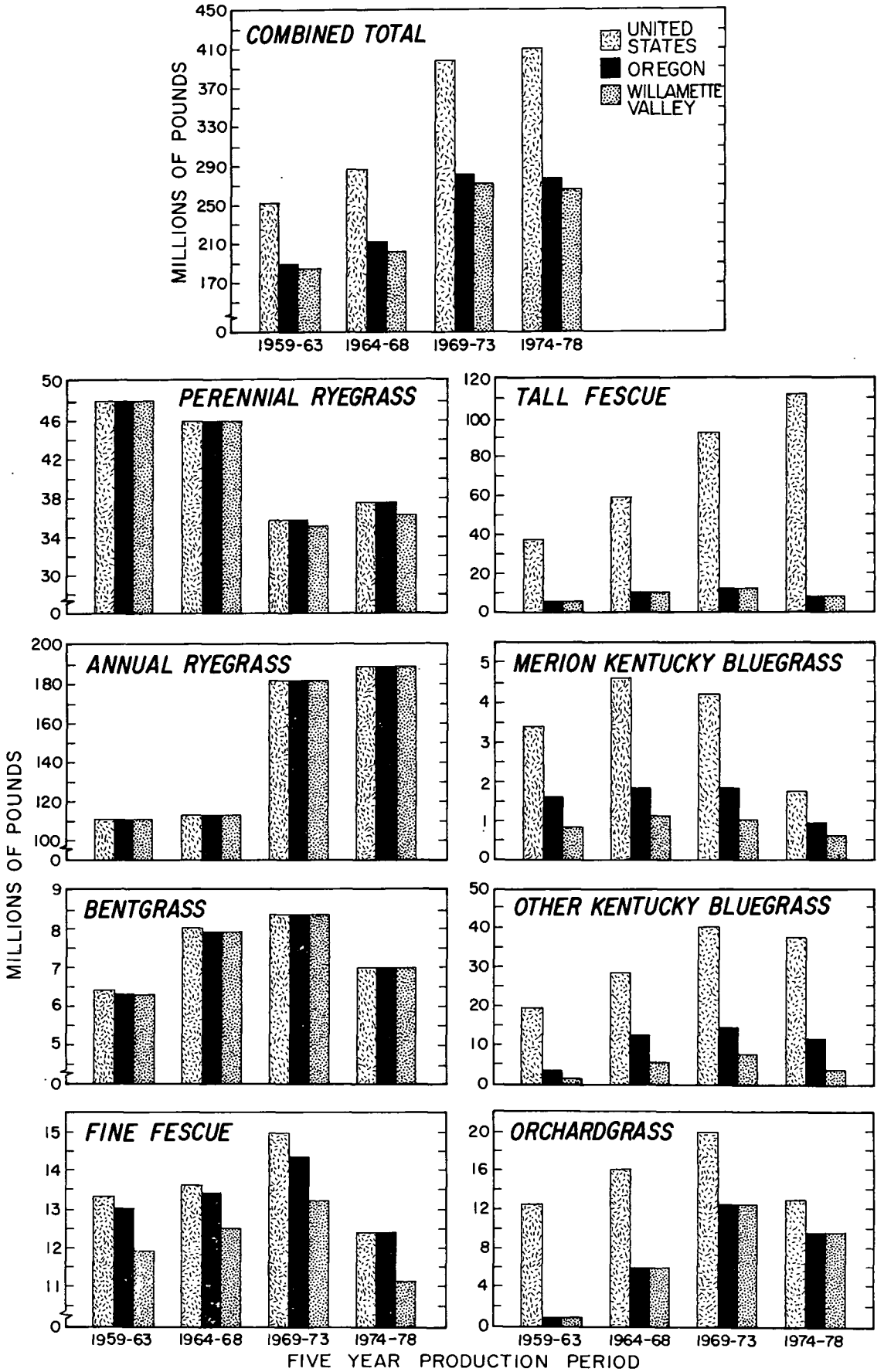

Figure 5. Production of cool season grass seed by seed type for the U.S., Oregon, and Willamette Valley, expressed as 5-year averages for 1959-1963 through 1964-1978.

Since the 1971 record production year for the Willamette Valley of 324 million pounds, Valley production has ranged from 232 to 304 million pounds per year. This fairly stable total production has occurred in spite of consistently declining grass seed acreage in the Valley during much of the 1970s as shown in Figure 6. A high of 285 thousand acres occurred in 1970 with a gradual decline to 234 thousand acres in 1976 (Appendix Table 4). By 1979, acreage levels had increased 254 thousand acres.

Offsetting yield increases per acre and shifts in the grass seed crop mix grown in the Valley appear to be important factors explaining the relatively stable level of total Willamette Valley production over time (Appendix Table 3) [5]. Production shifts have been away from the lower yielding bluegrasses and public varieties of perennial ryegrasses, and toward the higher yielding annual ryegrasses and proprietary varieties of perennial ryegrass. Annual yield responses, presented in Figure 7 by seed type, generally support such a shift. Perennial ryegrass, while the only seed type showing a declining long-term yield trend since 1973, shows what may be a stabilization and perhaps ultimate reversal of the negative trend. This change is consistent in time with the shift in acreage toward proprietary varieties. Although public and proprietary varieties are not separated in the data base, the seed trade indicates that proprietary varieties of perennial ryegrass grown in the Valley typically yield higher than the public varieties. This is partly because of their being grown on higher quality land than was done with the public varieties of perennial ryegrass. Some shifting of acreage of proprietary perennial ryegrass, Merion, and other Kentucky bluegrass to irrigated regions of eastern Oregon, eastern Washington, and Idaho has occurred during the 1970s. This is attributed largely to annual bluegrass and annual ryegrass contaminant problems cropping up in grass seed produced under contract in the Valley.

Imports

Fine fescue is the only grass seed type imported to the U.S. in significant quantities (Figure 2 and Appendix Table 10). Most of it is in the form of creeping red fescue from Alberta and British Columbia provinces in Canada. The U.S. is the major market for such Canadian fescue; and, since it is non-certified, it cannot be marketed in Europe. Furthermore, it is

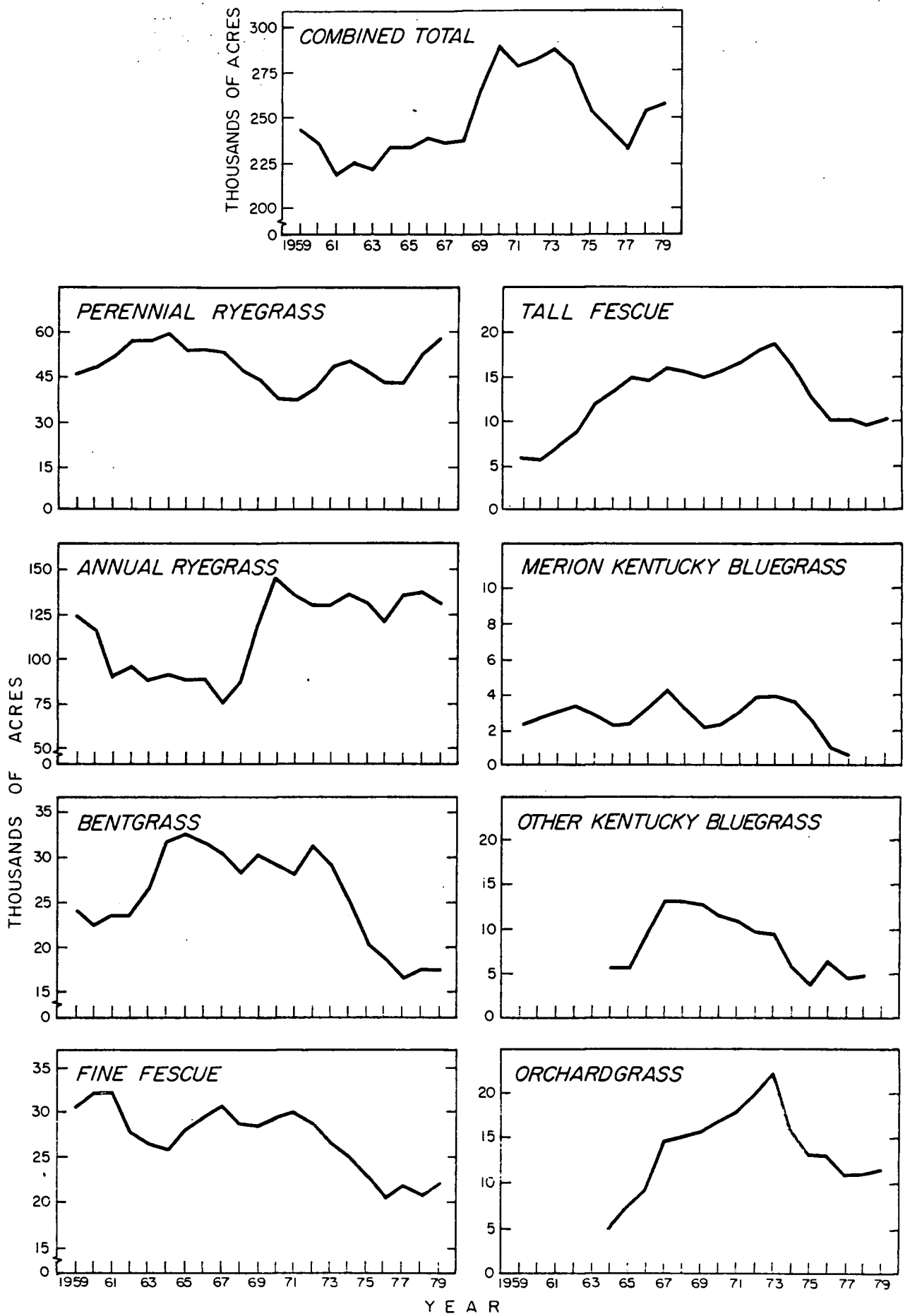

Figure 6. Annual Willamette Valley acreage of cool season grass seed by seed type, 1959-1979.

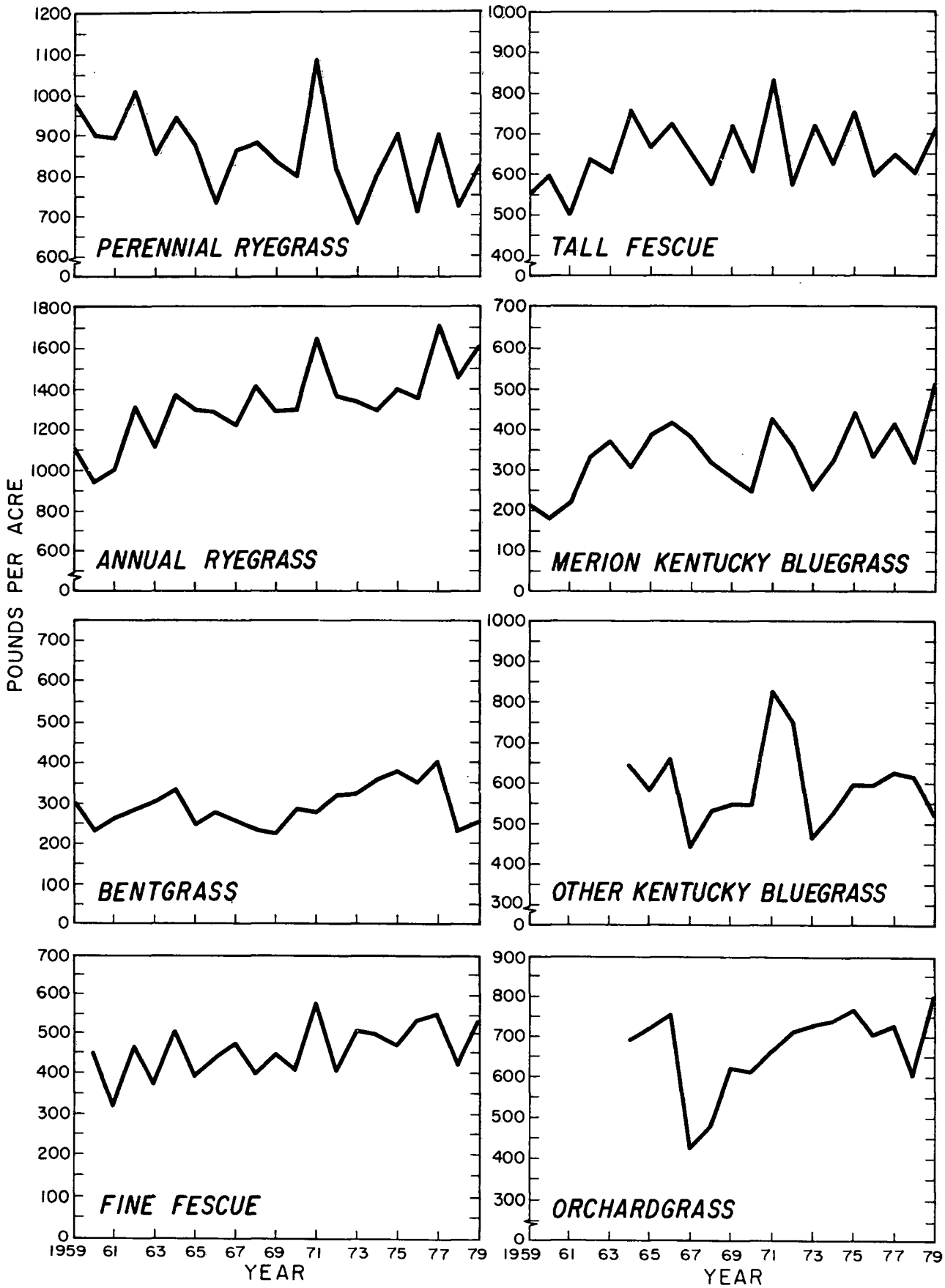

Figure 7. Annual Willamette Valley yield per acre of cool season grass seed by seed type, 1959-1979.

viewed in the U.S. seed trade as an important choice in lawn turf mixes, especially in years when the price of Canadian red fescue is low relative to U.S. produced seed types considered in the mix.

Historically, the U.S. has been a deficit producer of orchardgrass, importing significant quantities from Denmark. Declining U.S. consumption of orchardgrass essentially has eliminated the need for orchardgrass imports in recent years. Orchardgrass exports in 1977, 1978, and 1979 were important for the first time since initiation of the data base in 1959. Imports essentially were negligible for the 1977-79 period. While unknown, this change may imply a more permanent reversal from import to export status for orchardgrass.

Small quantities of imports show up in Appendix Table 10 for nearly all the other grass seed types. This involves both (1) a return of U.S.-produced seed, which did not meet quality standards imposed by the importing country, and (2) importing of proprietary foundation seed for propagation in the U.S. under contract.

Deletions from Carryover Stocks

Farm stocks have been kept at relatively constant and low levels throughout the study period, averaging less than 10 percent of total production volumes in most years. Figure 4 illustrates deletions from and additions to farm carryover stocks for each of the grass seed categories and for all grass seed types combined. When farm sales exceed farm production, stocks are being depleted. There is a general trend toward stock depletion following periods of low production volumes, e.g., 1962-1963 and 1968-1969 for multipurpose use seed which lagged 1961 and 1967 low production years. Stock depletion also follows periods of dramatic decreases in production levels relative to previous years, e.g., 1972 and 1976.

Because total wholesaler owned inventories have been much greater in volume than farmer owned inventories, ranging from 17 to nearly 40 percent of total available supply (U.S. production plus imports), there is more opportunity for substantial absolute variation in wholesaler inventories. Nevertheless, wholesaler inventories of most seed types have remained remarkably stable, especially given dramatic changes in production and consumption trends, largely from the purchase-sale commitment of most wholesaler transactions which involve little if any speculative components. There was, however,

a marked reduction in ryegrass carryover stocks in 1968, and a gradual increase in cover crop seed inventories over the entire study period. The latter trend may reflect the proportional growth of production in this category, relative to multipurpose and lawn and turf use categories.

Components of U.S. Disposition

Grass seed produced in the U.S. is sold for domestic consumption, exported to international markets, or added to carryover stocks held by farmers and seed wholesalers in anticipation of better market conditions in the future.

U.S. Consumption

About 85 percent of U.S. cool season grass seed production is consumed domestically. Well over half of such consumption is in the form of annual and perennial ryegrass seed. Tall fescue and bluegrasses rank second and third, respectively, in domestic consumption. From 1965 through 1976, almost no bentgrass was consumed domestically (Appendix Table 11). Since 1977, a small amount has been used in the U.S. Whether this is part of a long-term trend in unknown.

From 1959 through 1978, the volume of U.S. grass seed consumption increased substantially for annual ryegrass and tall fescue; remained about the same for fine fescue, all Kentucky bluegrass, and perennial ryegrass, and decreased for orchardgrass. Total domestic consumption for the 1959-1968 decade ranged from 232 to 298 million pounds per year. In the 1969-1978 decade, total domestic cool season grass seed consumption increased sharply from 277 million pounds to more than 427 million pounds.

Export

About 15 percent of the annual volume of U.S.-produced cool season grasses is exported. During the last decade, this has ranged from 44 to 60 million pounds annually. In the previous decade, exports ranged from 15 to 35 million pounds annually. This includes bentgrass, ryegrass, tall fescue, fine rescue, and bluegrass. Since 1968, essentially all U.S.-produced bentgrass has been exported. Since 1975, U.S. production of bentgrass has declined markedly, resulting in a reduced volume of bentgrass exports. Danish production of cool season grass seed types appears to be a major factor in marketing U.S.-

produced grass seed overseas, at least into the EEC. While the EEC has historically been the major export market for U.S. grass seed production, several EEC member countries generally, and Denmark in particular, also are the major source of competition in those international markets. Annual increases and reductions in U.S. volumes of grass seed exports tend to coincide with low and high volume of Denmark grass seed production, respectively. High Danish production, from 1967 to 1969, and again in 1974, 1975, and 1976, coincided with low U.S. export levels. Low Danish production in 1970 coincided with a 60 percent increase in U.S. export levels from 1969 to 1970. Such sensitivity to EEC demands and Danish production would not have been possible without the OECD certification agreement.

Essentially all bentgrass goes to EEC and other European countries, with West Germany, France, Netherlands, United Kingdom, and Sweden being the principal buyers. The EEC and other European countries dominate as buyers for fine fescues. Small amounts are purchased by Japan and Australia. Overseas bluegrass markets are more widely dispersed and include Canada, Japan, Australia, and EEC countries as buyers. Principal buyers of tall fescue include the EEC, Japan, and Australia. From 1964 through 1976, essentially no orchardgrass seed was exported from the U.S. However, since 1977, small but significant amounts of U.S. produced orchardgrass seed were exported, principally to Canada, Chile, and Japan. The dominant buyers for annual ryegrass are Japan, Netherlands, Canada, Mexico, and Brazil. For perennial ryegrass, the principal buyers are Netherlands, Canada, Mexico, Italy, Japan, and Brazil.

Trade restrictions on exporting U.S. grass seeds to other countries, particularly in the EEC, provide protectionist differentials for foreign producers of grass seeds. These trade restrictions take the form of foreign producer subsidies and non-tariff (quality) trade barriers which restrict the flow of grass seed imported from other countries. Bahn and Jones [1] have estimated that EEC production subsidies to member countries during 1975 and 1976 amounted to per pound government payments of 11.6 cents for Kentucky bluegrass, 11.0 cents for red fescue, 16.5 cents for tall fescue, and 8.0 cents for perennial ryegrass. These subsidies, paid to both growers (80 percent) and wholesalers (20 percent) are intended to induce higher production in the EEC, downward pressure on seed prices in the EEC, and hence lower demand for imports from the U.S.

Perhaps an even more significant factor affecting the volume of U.S. grass seed exports is the myriad of non-tariff barriers impacting grass seed exports. These trade constraints affect the exports of all countries, but, because the U.S. is the major seed exporter, these barriers are of particular importance. These barriers include: (1) strict phytosanitary requirements in Europe and strict health regulation in Japan, (2) arbitrary and strict breeding requirements and the assessment of high testing fees for approval of new varieties for inclusion on EEC inscription lists, and (3) the application of minimum or threshold pricing in France.

Thus, domestic exporters recently have begun to examine and exploit the export potential of Africa, the Middle East, and South America, which may someday provide a viable addition to the European export market.

Additions to Carryover Stocks

As noted earlier, volumes of farm carryover stocks have remained stable over the period, additions appear to be made primarily to assure a minimal stock of seed for replanting and on-farm uses, i.e., substantial additions occur only after substantial depletions. There is also a slight tendency toward inventory additions when production is increasing (possibly involuntary additions as they quickly were depleted again), and toward increased farm inventories over time (Figure 4).

Additions to wholesaler stocks have been more constant than farm stocks. Only for the covercrop grass seed, tall fescue, have there been substantial changes in the form of increased dealer stocks over time, reflecting rapid growth in supply, domestic consumption, and export in recent years.

Market Price

Average annual reported market price for each of the eight cool season grass seed types is presented in Figure 8 for the 21-year period from 1959 through 1979. Three market levels are included: (1) farm level price in Oregon, (2) wholesale (first handler) level price in Oregon, and (3) U.S. retail level price for four pasture and cover-crop grass seeds.

Average Annual Farm Price in Oregon

Wide variations in farm price occur from year to year as a regular

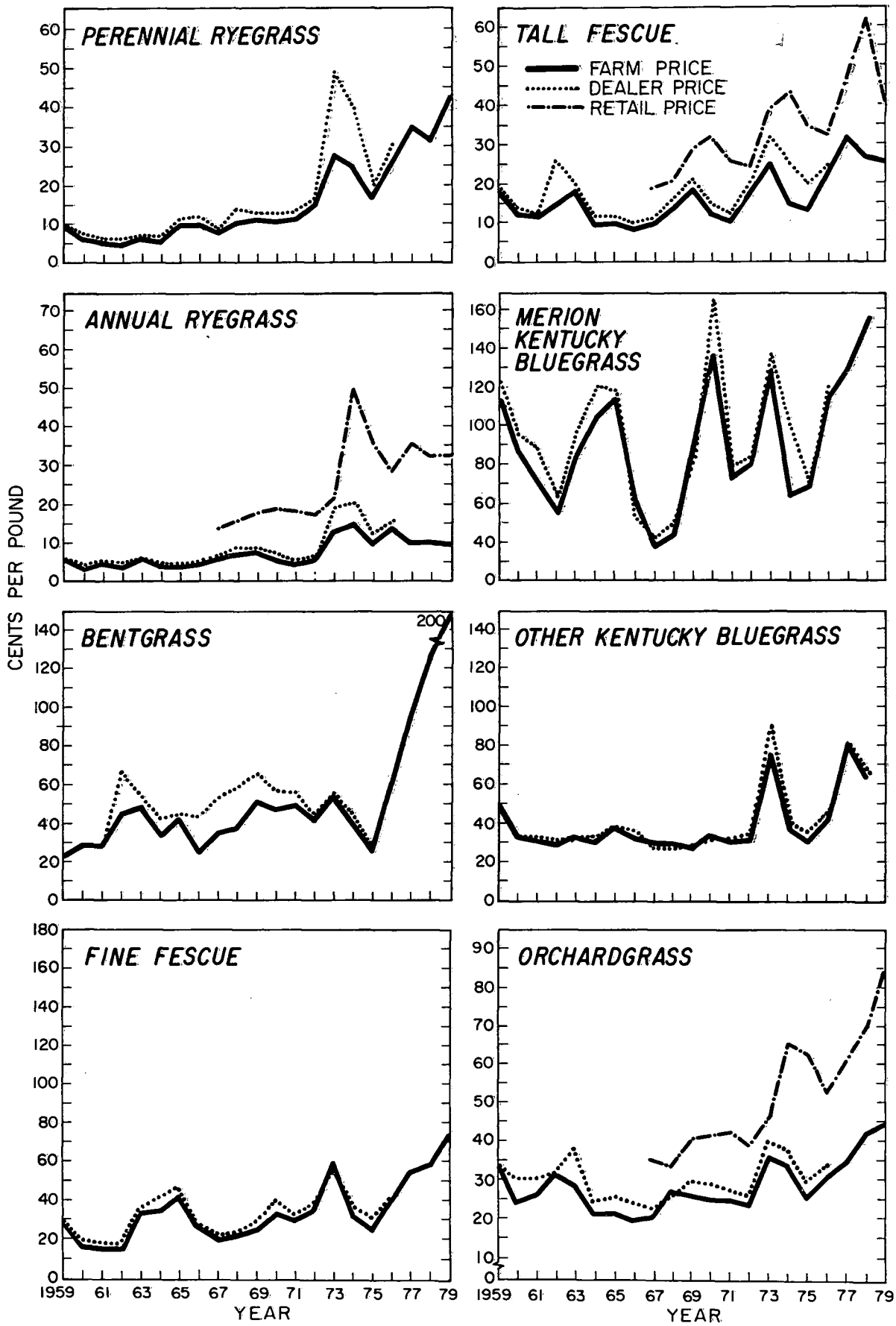

Figure 8. Annual average price for cool season grass seed by seed type at Oregon farm, Oregon wholesale, and selected retail market levels, 1959-1979.

market phenomenon. For most seed types, record highs were realized in 1969, 1973, and 1978. Such prices have tended to follow one or two years of relatively low production. Record low prices occurred in 1961, 1967, 1971, and 1975, after one or more years of relatively high production. Annual ryegrasses had the lowest relative farm gate price, averaging 9.8 cents per pound, over the last 10 years. Merion Kentucky bluegrass had the highest average farm price at $1.04 per pound.

Average Annual Wholesale Price in Oregon

The Oregon wholesale price level followed closely the Oregon farm gate price, but was more exaggerated. In periods of rising market prices, the wholesale price generally exceeded farm price by some margin. In years of low or declining prices, the wholesale price approached farm price, and in some instances, as with orchardgrass and other Kentucky bluegrasses in 1968, was less than farm price.

Retail Price for Selected Grass Seeds

U.S. level retail prices for orchardgrass, tall fescue, and annual ryegrass used for pasture and covercrop purposes are presented in Figure 8. Such retail prices must be used with great caution, since they represent a small portion of the total retail sales of such grasses and reflect only sales to U.S. farmers on April 15. The delayed reporting date, as well as the usual delayed marketings from annual harvest to retail sales, shows up as a one-year lag in price effect when compared with farm gate and wholesale level price. A larger range in price variation between years of low and high prices occurs at the retail level. Whether such degree of price variability exists in retail markets for lawn and turf and multiple purpose grasses is not known.

REFERENCES

1. Bahn, Henry, and James Jones. "Feasibility of Expanding Grass Seed Exports from the Clear Water Economic Development District." Department of Agricultural Economics, University of Idaho, Moscow, March 1978.

2. Belmont, Frank, ESS, USDA Office in Portland. Personal Communication, September 1980.

3. Brewer, Donald. Personal communication, August 1979 and June 1980.

4. Canada Department of Agriculture, Production and Marketing Branch, Plant Products Division. Final Seed Crops Report. Annual summary, Ottawa.

5. Conklin, Frank S., and Jon Dean. "Costs and Returns of Grass Seed Production in Oregon's Willamette Valley, 1959 to 1975." Oregon Agricultural Experiment Station Special Report 464, Oregon State University, Corvallis, October 1976.

6. Conklin, Frank S., and Dan J. Wilson. "The Economic Returns of Annual Ryegrass Production in Oregon's Willamette Valley, 1959 to 1975." Oregon Agricultural Experiment Station Special Report 436, Oregon State University, Corvallis, May 1975.

7. Conklin, Frank S., and Douglas E. Fisher. "Economic Characteristics of Farms Producing Grass Seed in Oregon's Willamette Valley." Oregon Agricultural Experiment Station Circular of Information 603, Oregon State University, Corvallis, November 1977.

8. Conklin, Frank, and Carlyle Bradshaw. "Farmer Alternatives to Open Field Burning: An Economic Appraisal." Oregon Agricultural Experiment Station Special Report 336, Oregon State University, Corvallis, October 1971.

9. Middlemiss, W., and R. Coppedge. "Oregon's Grass and Legume Seed Industry in Economic Perspective." Oregon State University Cooperative Extension Service Special Report 284, Corvallis, April 1970.

10. Oregon State University Extension Service and Oregon Crop and Livestock Service, ESS, USDA, Portland, Oregon, cooperating. Unpublished data of annual acreage, yield, and production data of cool season grasses by county in Oregon. Available from the Office of Economic Information, Department of Agricultural and Resource Economics, Oregon State University, Corvallis.

11. U.S. Department of Agriculture, Agricultural Marketing Service. "Bentgrass Seed Grown in Oregon: Decision on a Proposed Marketing Agreement and Order." Washington, D.C., 1974.

12. U.S. Department of Agriculture, Crop Reporting Board, ESS. Seed Crops. Monthly and annual summaries, Washington, D.C.

13. U.S. Department of Agriculture, Crop Reporting Board, ESS. Agricultural Prices. Monthly and annual summaries, Washington, D.C.

14. U.S. Department of Agriculture, Foreign Agriculture Service. Seeds, Field, and Vegetable. Monthly and annual summaries, Washington, D.C.

15. U.S. Department of Agriculture, Office of the Agricultural Attache, Foreign Agricultural Service, American Embassy. Unpublished data on Danish production of cool season grass seeds. Copenhagen, Denmark.

APPENDIX

Appendix Table 1. Annual United States Production of Cool Season Grass Seed by Seed Type, 1958-1979

Year Beginning July	Fescue [a]	Bentgrass	Merion Kentucky Bluegrass	Other Kentucky Bluegrass	Tall Fescue	Orchard-grass	Annual Ryegrass	Perennial Ryegrass	Total
	1,000 pounds								
1958.....	8,586	6,152	1,699	28,610	30,558	16,130	63,360	28,080	183,175
1959.....	16,230	6,765	3,197	35,500	28,594	9,980	136,400	45,080	281,746
1960.....	16,038	5,092	3,148	29,400	37,580	13,320	106,953	43,010	254,541
1961.....	11,918	5,897	3,455	5,560	34,209	12,850	90,040	46,320	210,249
1962.....	14,078	6,254	4,072	9,300	27,541	15,690	123,500	57,380	257,815
1963.....	11,000	7,888	3,333	14,018	39,109	7,970	97,275	48,450	229,043
1964.....	13,230	9,673	3,317	19,238	61,924	14,940	123,305	56,385	302,012
1965.....	12,304	7,746	3,613	22,833	56,564	13,490	113,480	46,980	277,010
1966.....	14,093	8,463	5,143	30,247	79,593	10,010	112,520	39,420	299,489
1967.....	16,243	7,978	6,496	34,651	49,739	6,880	91,380	45,580	258,947
1968.....	12,388	6,516	4,531	33,924	55,832	6,510 [b]	122,120	41,360	283,181
1969.....	13,773	5,733	2,927	33,709	64,833	8,060 [b]	152,340	36,740	318,115
1970.....	13,410	7,473	3,390	36,519	83,065	8,673 [b]	186,300	32,000	370,830
1971.....	16,470	10,193	5,179	48,643	91,462	8,273 [b]	223,440	41,040	444,700
1972.....	13,145	9,632	5,088	46,622	88,995	19,270	176,230	34,830	393,812
1973.....	14,950	9,585	4,321	35,859	131,970	20,379	168,800	40,000	425,864
1974.....	14,575	9,230	3,988	55,603	103,860	15,942	176,100	42,400	421,698
1975.....	12,470	7,790	2,294	36,578	123,120	10,375	183,600	43,200	419,427
1976.....	12,045	6,650	1,053	33,781	85,310	12,060	195,940	31,240	378,079
1977.....	11,500	6,800	806	18,960	107,670	10,348	231,200	39,600	426,884
1978.....	11,900	4,140	44,966 [c]		171,360	13,590	200,100	40,880	486,936
1979.....	12,400	4,500	36,390 [c]		96,490	15,565	196,850	49,550	411,745

Source: U.S. Department of Agriculture. Seed Crops, monthly and annual summaries. Crop Reporting Board, ESS, USDA, Washington, D.C.

[a] Chewings and red fescue.

[b] Years 1968-71 show inconsistency between Seed Crops estimate for U.S. production and Oregon Crop and Livestock Reporting Service in which Oregon estimates exceed U.S. estimates.

[c] Termination in separate reporting of Merion Kentucky bluegrass [illegible]

Appendix Table 2. Annual Oregon Production of Cool Season Grass Seed by Seed Type, 1958-1979

Year	Fescue[a/]	Bentgrass	Merion Kentucky Bluegrass	Other Kentucky Bluegrass	Tall Fescue	Orchard-grass	Annual Ryegrass	Perennial Ryegrass	Total	Oregon production as percent of U.S. production
	1,000 pounds									
1958	8,025	6,000	825	0	2,216	0	63,360	28,080	108,506	59.2
1959	15,290	6,670	1,608	844	3,402	176	136,400	45,080	209,470	74.3
1960	15,920	5,060	1,350	1,512	3,596	304	106,760	43,010	177,512	69.7
1961	11,525	5,865	1,425	2,768	3,750	473	90,040	46,320	162,166	77.1
1962	13,840	6,210	1,960	2,926	5,670	880	123,310	57,380	212,176	82.3
1963	10,040	7,830	1,440	5,755	7,260	2,034	97,275	48,450	180,084	79.4
1964	13,170	9,610	1,190	8,580	10,058	3,622	123,305	56,385	225,920	74.8
1965	12,010	7,680	1,633	8,890	10,050	5,300	113,480	46,980	206,023	74.4
1966	13,845	8,370	2,296	13,400	10,513	6,882	112,520	39,420	207,246	69.2
1967	15,830	7,950	2,340	14,625	10,430	6,194	91,380	45,580	194,329	75.0
1968	12,210	6,500	1,575	16,200	8,960	7,200	122,120	41,360	216,125	76.3
1969	13,725	5,720	957	13,235	10,800	9,610	152,340	36,740	243,127	76.4
1970	13,410	7,425	1,044	11,880	9,455	10,404	186,300	32,000	271,918	73.3
1971	16,470	10,125	1,968	16,905	13,695	11,948	223,440	41,040	335,591	75.5
1972	13,145	9,520	2,040	14,700	10,440	14,080	176,230	34,830	274,985	69.8
1973	14,950	9,585	2,030	12,600	13,320	15,600	168,800	40,000	276,885	65.0
1974	14,575	9,230	1,980	14,910	10,080	11,880	176,100	42,400	281,155	66.7
1975	12,470	7,790	1,120	15,645	9,500	10,375	183,600	43,200	283,700	67.6
1976	12,045	6,650	480	10,200	6,000	9,230	164,700	31,240	240,545	63.6
1977	11,500	6,800	400	9,000	6,175	8,030	231,200	39,600	312,705	73.2
1978	11,900	4,140	360	12,740	6,650	11,200	200,100	40,880	287,970	59.1
1979	12,400	4,500	12,238[b/]		7,200	13,600	196,850	49,550	296,338	72.0

Source: Oregon State University Extension Service and Oregon Crop and Livestock Reporting Service, ESS, USDA, Portland, Oregon, cooperating, and reported in Seed Crops [12].

a/ Chewings and red fescue

b/ Termination in separate reporting of Merion Kentucky bluegrass from all Kentucky bluegrass.

Appendix Table 3. Annual Willamette Valley Production of Cool Season Grass Seed by Seed Type, 1959-1979

Year	Fescue[a/]	Bentgrass	Merion Kentucky Bluegrass	Other Kentucky Bluegrass	Tall Fescue	Orchard-grass	Annual Ryegrass	Perennial Ryegrass	Total	Willamette Valley production as percent of U.S. production	Willamette Valley production as percent of Oregon production
	1,000 pounds										
1959	13,583	6,070	499	b/	3,312	b/	136,400	45,080	-	-	-
1960	14,403	4,433	493	b/	3,504	b/	106,953	43,010	-	-	-
1961	10,262	5,172	679	b/	3,666	b/	90,000	46,320	-	-	-
1962	12,631	5,666	1,109	b/	5,588	b/	123,500	56,970	-	-	-
1963	9,795	7,073	1,075	b/	7,193	b/	97,275	48,450	-	-	-
1964	12,972	8,903	714	3,797	9,992	3,507	123,305	56,385	219,575	72.7	97.2
1965	10,976	7,680	926	3,387	10,016	5,249	113,480	46,980	198,694	71.7	96.4
1966	12,752	7,806	1,384	6,238	10,505	6,873	112,520	39,420	197,498	70.7	94.2
1967	14,386	7,603	1,616	5,803	10,399	6,191	91,380	45,580	182,958	70.7	94.2
1968	11,363	6,100	1,014	6,955	8,931	7,200	122,120	41,360	205,043	75.1	93.5
1969	12,656	5,400	613	7,029	10,772	9,610	152,340	36,740	235,160	73.9	96.7
1970	11,938	7,147	603	6,388	9,423	10,384	186,300	32,000	264,183	71.2	97.2
1971	15,176	9,663	1,281	9,041	13,657	11,936	223,440	40,310	324,504	73.0	96.7
1972	11,665	8,980	1,397	7,294	10,380	14,065	176,230	33,680	263,691	67.0	95.9
1973	13,405	9,099	1,037	4,371	13,290	15,620	168,800	38,550	264,172	62.0	95.4
1974	12,435	8,873	1,156	3,867	10,044	11,880	176,100	40,726	265,081	62.9	94.3
1975	10,748	7,641	706	4,558	9,500	10,375	183,600	42,420	269,548	64.3	95.0
1976	10,785	6,528	356	3,709	6,000	9,230	164,700	30,670	231,978	61.4	96.4
1977	10,379	6,617	305	2,955	6,175	8,030	231,200	38,691	304,352	71.3	97.3
1978	9,995	3,943	267	3,061	6,650	11,200	200,100	37,120	272,336	55.9	94.6
1979	11,059	4,307	4,008[c/]		7,200	13,600	196,850	47,573	284,597	69.1	96.0

Source: Oregon State University Extension Service and Oregon Crop and Livestock Reporting Service, ESS, USDA, Portland, Oregon, cooperating, [10].

[a/] Chewings and red fescue

[b/] Data not reported for other Kentucky bluegrass and orchardgrass prior to 1964.

[c/] Termination in separate reporting of Merion Kentucky bluegrass from all Kentucky bluegrass.

Appendix Table 4. Annual Willamette Valley Acreage Harvested for Cool Season Grass Seed by Seed Type, 1959-1979

Year	Fescue[a]	Bentgrass	Merion Kentucky Bluegrass	Other Kentucky Bluegrass	Tall Fescue	Orchard-grass	Annual Ryegrass	Perennial Ryegrass	Total Willamette Valley grass seed acres [a]
	number of acres								
1959	30,456	24,000	2,300	[b]	6,010	[b]	123,950	45,900	242,616
1960	32,150	22,500	2,680	[b]	5,850	[b]	115,000	47,900	236,080
1961	32,170	23,500	3,030	[b]	7,230	[b]	89,950	52,000	217,880
1962	27,400	20,350	3,330	[b]	8,800	[b]	95,000	56,970	224,900
1963	26,200	23,600	2,890	[b]	11,850	[b]	88,000	56,950	222,440
1964	25,790	27,200	2,280	5,860	13,200	5,090	91,000	59,990	230,410
1965	27,930	29,160	2,450	5,790	14,950	7,290	88,000	54,000	229,570
1966	29,180	28,660	3,310	9,380	14,450	9,140	88,000	54,000	236,120
1967	30,480	28,260	4,230	12,670	13,920	6,187	75,000	53,000	223,747
1968	28,480	24,360	3,150	13,920	15,425	8,590	96,000	47,000	236,925
1969	28,250	24,450	2,150	14,850	15,500	9,610	119,000	44,000	257,810
1970	29,010	24,600	2,400	11,600	15,420	16,950	145,000	40,000	284,980
1971	30,750	25,200	3,000	10,920	16,400	17,970	136,000	37,150	277,390
1972	28,500	26,080	3,900	9,690	17,850	21,950	130,000	41,670	279,640
1973	26,380	25,400	3,950	9,350	18,470	22,000	130,000	48,200	283,750
1974	25,100	24,950	3,550	6,950	15,950	18,000	137,000	50,650	282,150
1975	22,600	20,090	2,000	7,250	12,500	12,500	132,000	47,100	256,040
1976	20,150	18,600	1,050	6,150	10,000	13,000	122,000	43,300	234,250
1977	20,000	16,550	730	4,690	9,500	11,000	136,000	42,900	241,370
1978	22,500	17,450	810	5,590	9,500	14,000	138,000	51,770	259,620
1979	20,170	17,380	6,420[c]		10,000	16,000	127,000	57,710	254,680

Source: Oregon State University Extension Service, Corvallis, and Oregon Crop and Livestock Reporting Service, ESS, USDA, Portland, Oregon, cooperating [10].

[a] Chewings and red fescue.

[b] Data not reported for other Kentucky bluegrass and orchardgrass prior to 1964. Acreages of other Kentucky bluegrass and orchardgrass prior to 1964 estimated at 5,000 acres for each seed type.

[c] Termination in separate reporting of Merion Kentucky bluegrass from all Kentucky bluegrass.

Appendix Table 5. Annual Willamette Valley Yield Per Acre of Cool Season Grass Seed by Seed Type, 1959-1979

Year	Fescue[a/]	Bentgrass	Merion Kentucky Bluegrass	Other Kentucky Bluegrass	Tall Fescue	Orchard-grass	Annual Ryegrass	Perennial Ryegrass
	pounds per acre							
1959	446	301	217	b/	551	b/	1,100	980
1960	448	232	184	b/	599	b/	930	896
1961	319	260	224	b/	507	b/	1,000	890
1962	461	278	333	b/	635	b/	1,300	1,005
1963	374	300	372	b/	607	b/	1,105	850
1964	503	327	313	648	757	689	1,355	940
1965	393	243	378	585	670	720	1,290	870
1966	437	272	418	665	727	752	1,279	730
1967	472	251	382	443	653	427	1,218	860
1968	399	232	322	535	579	480	1,404	880
1969	448	222	285	550	722	620	1,280	835
1970	412	290	251	551	611	613	1,280	800
1971	494	380	427	828	833	664	1,643	1,090
1972	409	340	358	753	582	640	1,360	810
1973	508	360	300	467	720	710	1,300	806
1974	495	360	330	560	630	660	1,290	804
1975	475	380	353	630	760	830	1,390	900
1976	535	350	340	600	600	710	1,350	708
1977	520	400	420	630	650	730	1,700	900
1978	445	230	330	550	700	800	1,450	720
1979	550	250	620[c/]		720	850	1,550	820

Source: Oregon State University Extension Service and Oregon Crop and Livestock Reporting Service, ESS, USDA, Portland, Oregon, cooperating [10].

a/ Chewings and red fescue

b/ Data not reported for other Kentucky bluegrass or orchardgrass prior to 1964.

c/ Termination in separate reporting of Merion Kentucky bluegrass from all Kentucky bluegrass.

Appendix Table 6. Annual Danish Production of Cool Season Grass Seed by Seed Type, 1959-1978

Year	Fescue[a/]	Bluegrass	Tall Fescue	Orchard-grass	Annual Ryegrass	Perennial Ryegrass	Total
	1,000 pounds						
1959	8,552	7,266	7,929	12,883	6,519	14,747	57,896
1960	4,978	5,309	8,349	11,605	4,345	11,978	46,564
1961	5,168	7,275	8,417	10,195	9,266	15,060	55,381
1962	4,619	10,792	7,272	12,039	7,789	17,250	59,761
1963	2,235	7,731	5,121	12,526	7,568	16,380	51,561
1964	5,373	10,501	6,285	16,971	12,832	21,508	73,470
1965	6,470	10,315	5,260	13,761	11,867	18,351	66,024
1966	9,757	10,273	8,721	13,497	10,609	17,452	70,309
1967	14,700	13,882	12,500	11,398	16,193	32,081	100,754
1968	10,291	12,299	7,374	7,487	17,361	31,065	85,877
1969	9,687	10,803	4,537	11,304	21,176	33,323	90,830
1970	4,669	5,287	4,407	20,582	9,370	20,707	65,022
1971	9,321	9,576	5,384	10,675	24,057	30,622	89,635
1972	12,934	13,091	8,984	6,056	21,836	28,282	91,183
1973	14,702	11,887	8,885	5,549	13,761	21,715	76,499
1974	22,379	11,261	7,363	6,989	14,826	46,843	109,661
1975	19,650	10,481	8,970	6,862	17,751	49,819	113,533
1976	18,858	10,188	8,721	6,673	17,250	46,592	108,282
1977	9,396	6,411	4,950	6,171	11,253	23,014	61,195
1978	11,411	9,304	4,050	5,069	19,188	23,982	73,004

Source: Data reported by Office of the Agricultural Attache, Foreign Agricultural Service, U.S. Department of Agriculture, of the American Embassy in Copenhagen, Denmark.

[a/] Chewings and red fescue.

Appendix Table 7. Annual U.S. Farm Stocks of Cool Season Grass Seed as of July 1 of Reported Year by Seed Type, 1959-1979

Year	Fescue[a/]	Bentgrass	Merion Kentucky Bluegrass	Other Kentucky Bluegrass[b/]	Tall Fescue	Orchard-grass	Annual Ryegrass	Perennial Ryegrass	Total
	1,000 pounds								
1959	344	249	13	1,913	911	611	1,267	1,500	6,808
1960	1,928	68	235	903	515	178	19,430	4,636	27,893
1961	1,892	187	164	1,876	2,345	197	13,166	3,967	23,794
1962	1,784	88	209	1,217	1,160	329	6,685	2,857	14,329
1963	1,581	62	180	1,148	399	182	3,418	4,898	11,858
1964	333	235	37	973	1,750	264	4,895	4,699	13,186
1965	92	209	0	753	4,208	500	9,445	4,235	19,442
1966	240	784	78	780	2,849	363	12,035	5,969	23,098
1967	1,393	857	183	980	7,652	397	7,385	3,416	22,263
1968	988	823	373	1,276	2,199	240	2,963	4,411	13,273
1969	1,049	455	212	1,307	1,505	216	1,263	3,413	9,420
1970	560	114	106	1,167	2,163	259	6,094	7,348	17,811
1971	341	223	96	999	6,386	282	26,082	1,920	36,329
1972	434	113	90	1,348	2,857	268	29,047	82	34,239
1973	132	327	215	1,559	1,397	748	381	174	4,933
1974	1,055	742	406	2,307	6,397	947	18,568	4,400	34,822
1975	3,758	2,125	1,415	9,908	9,151	1,922	12,327	4,664	45,270
1976	1,065	1,558	1,045	15,193	7,119	654	12,852	6,048	45,534
1977	970	865	315	5,185	1,615	1,025	4,941	1,562	16,478
1978	930	68	74	1,159	2,007	238	28,900	1,386	34,762
1979	815	124	1,787[c/]		21,336	105	22,011	409	46,587

Source: Seed World and Seed Crops. Annual summaries, Agricultural Statistics, U.S. Department of Agriculture [12].

[a/] Chewings and red fescue.

[b/] Data were available for farm stocks from Other Kentucky Bluegrass from 1970. Prior years were estimated at 10 percent of total stocks.

[c/] Termination in separate reporting of Merion Kentucky bluegrass from all Kentucky bluegrass.

Appendix Table 8. Annual U.S. Wholesale Stocks of Cool Season Grass Seed as of July 1 of Reported Year by Seed Type, 1959-1980

Year	Fescue[a/]	Bentgrass	Merion Kentucky Bluegrass[b/]	Other Kentucky Bluegrass	Tall Fescue	Orchard-grass	Annual Ryegrass	Perennial Ryegrass	Total Stocks: Dealers	Total Stocks: Total farmers plus Wholesalers	Farm Stocks as percent of Total Stocks	Total Stocks as percent of U.S. Production
	1,000 pounds											
1959	5,805	3,085	571	17,214	5,258	3,780	12,194	8,140	56,047	62,855	11	22
1960	8,836	2,157	899	8,127	1,669	3,693	37,061	8,840	71,282	99,175	28	39
1961	17,449	1,354	1,448	16,880	7,601	3,018	30,284	9,115	87,149	110,943	21	53
1962	13,118	1,075	1,813	10,950	4,715	3,212	29,207	12,468	76,558	90,887	16	35
1963	9,453	1,197	1,743	10,336	2,358	3,950	24,711	13,576	67,324	79,192	15	35
1964	6,238	2,201	1,424	8,757	7,702	2,582	28,479	11,606	68,989	82,175	16	27
1965	4,450	2,717	1,684	6,777	10,299	4,549	31,547	7,797	69,820	89,262	22	32
1966	9,195	2,636	1,303	7,018	10,657	4,944	24,156	9,270	69,179	92,277	25	31
1967	8,149	1,950	2,463	8,819	18,432	6,044	26,316	6,544	78,717	100,980	22	39
1968	9,471	1,955	4,209	11,487	9,472	4,924	11,840	8,159	61,517	74,790	18	27
1969	8,892	1,742	3,079	13,065	5,030	5,450	14,800	14,039	66,097	75,517	12	24
1970	8,921	1,323	1,752	11,672	13,565	5,587	15,878	12,557	71,255	89,066	20	24
1971	9,236	1,496	1,290	9,965	12,820	5,964	23,355	9,453	73,579	109,908	33	25
1972	7,741	2,263	2,890	13,483	9,326	6,839	44,243	10,449	97,234	131,563	26	33
1973	5,569	2,444	2,311	15,593	9,430	7,154	30,850	10,157	83,508	33,441	6	21
1974	8,714	2,603	2,619	23,068	23,668	8,604	23,165	11,397	103,838	138,660	25	33
1975	8,178	2,000	1,986	28,200	18,205	8,013	20,623	11,542	98,147	144,017	31	34
1976	7,410	1,720	2,097	21,290	25,020	8,630	30,796	17,775	114,738	160,272	28	42
1977	11,070	1,550	1,100	20,280	9,850	7,170	20,700	13,970	85,690	102,168	16	24
1978	8,290	950	3,200	7,440	10,890	4,550	32,060	11,590	78,970	113,732	31	23
1979	6,110	580	15,810[c/]		30,240	3,000	20,260	14,070	90,070	136,657	34	32
1980	5,460	600	14,340		24,000	3,890	27,000	11,060	86,350			

Source: Seed World, Seed Crops, and Agricultural Statistics. Annual summaries, U.S. Department of Agriculture[12].

a/ Chewings and red fescue

b/ No data were available for total stocks of Merion Kentucky bluegrass prior to 1970. Prior years were estimated for dealers holding 90 percent of total stocks.

c/ Termination in separate reporting of Merion Kentucky bluegrass from all Kentucky bluegrass.

Appendix Table 9. Annual Exports from U.S. of Cool Season Grass Seed by Seed Type, 1959-1979

Year	Fescue[a]	Bentgrass	All Kentucky Bluegrass[b]	Tall Fescue	Orchard-grass	Annual Ryegrass[a]	Perennial Ryegrass	Total
	1,000 pounds							
1959	2,924	4,879	943	854	160	0	6,192	15,952
1960	6,488	3,141	1,576	1,412	199	765	6,184	19,765
1961	5,054	4,793	784	1,100	182	1,240	6,216	19,369
1962	3,906	4,129	612	792	110	2,762	5,682	17,993
1963	5,046	4,877	1,015	1,178	37	2,923	5,958	21,034
1964	5,933	7,187	1,196	1,465	0	1,521	6,395	23,697
1965	3,430	6,049	1,030	1,635	0	4,109	7,637	23,890
1966	5,696	8,098	953	2,828	0	6,123	7,069	30,767
1967	5,951	6,826	1,646	2,686	0	7,540	9,328	33,977
1968	8,926	6,278	2,420	2,398	0	8,213	2,783	31,018
1969	5,265	6,506	4,694	2,346	0	10,902	3,700	33,413
1970	12,689	7,501	7,266	4,171	0	15,701	7,613	54,941
1971	8,714	9,144	11,023	4,860	0	10,910	4,728	49,379
1972	7,923	9,676	13,601	6,454	0	14,830	6,118	58,602
1973	12,989	8,710	7,183	4,442	0	14,292	13,164	60,780
1974	9,831	8,176	13,523	3,109	0	8,874	6,972	50,484
1975	6,839	8,425	7,744	3,783	0	12,161	4,762	43,714
1976	8,284	7,366	10,082	4,391	0	13,422	5,265	48,810
1977	9,418	6,431	5,309	7,123	1,173	17,804	6,023	53,281
1978	6,541	4,301	6,376	6,501	2,482	17,216	6,069	49,486
1979	9,264	4,180	6,109	6,788	3,450	22,882	6,080	58,753

Source: Seeds, Field and Vegetable. Foreign Agricultural Circular, U.S. Department of Agriculture, Washington, D.C. [14].

[a] Chewings and red fescue.

[b] Export data do not separate Merion Kentucky bluegrass from other Kentucky bluegrass.

[c] Export data for annual and perennial ryegrass were not available prior to 1964. Estimates calculated for 1959-1963 were based on average percentage of total production exported in subsequent years.

Appendix Table 10. Annual Imports to U.S. of Cool Season Grass Seed by Seed Type, 1959-1978

Year	Fescue[a/]	Bentgrass	Merion Kentucky Bluegrass	Other Kentucky Bluegrass	Tall Fescue	Orchard-grass	Annual Ryegrass	Perennial Ryegrass	Total
	1,000 pounds								
1959.....	15,955	14	0	7,739	41	9,138	1,215	8	34,110
1960.....	15,105	3	0	4,224	0	4,965	3	104	24,404
1961.....	10,213	6	0	9,379	0	7,072	39	6	26,715
1962.....	12,722	8	1,116	10,965	111	5,165	61	5	30,153
1963.....	9,177	35	827	16,514	1	7,467	55	36	34,112
1964.....	7,432	16	950	13,107	7	5,406	51	161	27,130
1965.....	14,436	8	475	9,185	0	3,788	88	657	28,637
1966.....	9,730	9	1,073	5,767	1	5,821	82	212	22,695
1967.....	10,429	5	1,561	1,632	0	6,859	11	266	20,763
1968.....	16,391	110	626	230	1	8,196	47	603	26,204
1969.....	14,504	197	130	2,091	2	4,918	519	1,140	23,501
1970.....	16,729	20	66	83	21	1,670	171	696	19,456
1971.....	11,938	63	12	13	0	1,724	68	1,009	14,827
1972.....	11,165	11	0	0	49	1,453	105	853	13,636
1973.....	15,324	92	0	0	176	101	968	431	17,092
1974.....	10,592	41	0	0	10	83	211	1,433	12,370
1975.....	13,378	60	0	385	4	145	43	115	14,130
1976.....	22,374	53	0	799	6	1,227	190	826	25,475
1977.....	19,400	20	0	82	4	482	456	845	21,289
1978.....	12,100	17	379[b/]		52	284	256	498	13,586
1979..... (preliminary)	12,757	24	1,176		29	30	199	103	14,318

Source: Monthly and annual reports of agricultural imports admitted into the U.S. under the Federal Seed Act, prepared by Agricultural Marketing Service, Grain Division, Seed Branch, U.S. Department of Agriculture, Washington, D.C., and reported in Seed Crops [12].

[a/] Chewings and red fescue

[b/] Termination in separate reporting of Merion Kentucky bluegrass from all Kentucky bluegrass.

Appendix Table 11. Calculated Annual U.S. Consumption of Cool Season Grass Seed Type, 1959-1978

Year	Fescue[a/]	Bentgrass	All Kentucky Bluegrass	Tall Fescue	Orchard-grass	Annual Ryegrass	Perennial Ryegrass	Total
	1,000 pounds							
1959.....	24,646	3,009	55,040	31,766	19,478	94,585	35,060	263,584
1960.....	16,078	2,638	29,993	28,406	18,742	119,232	37,324	252,413
1961.....	21,516	1,488	18,789	37,180	19,414	96,357	37,867	232,611
1962.....	26,322	2,037	25,623	29,978	20,154	128,562	48,554	281,230
1963.....	17,356	1,869	35,893	31,237	16,686	89,162	44,697	236,900
1964.....	16,758	2,012	37,393	55,411	18,143	114,217	54,424	298,358
1965.....	18,417	1,211	35,111	55,930	17,020	114,260	36,793	278,742
1966.....	18,020	987	38,011	64,188	14,697	108,969	37,842	282,714
1967.....	19,774	1,186	37,794	61,466	15,016	102,749	33,908	271,893
1968.....	20,351	929	36,573	58,571	14,204	102,694	34,298	267,620
1969.....	23,472	184	19,466	53,296	12,798	136,048	31,727	276,991
1970.....	17,354	290	52,802	75,437	9,943	143,305	33,615	332,746
1971.....	21,096	455	37,363	93,625	9,136	188,745	38,163	388,583
1972.....	18,861	428	36,242	83,946	19,928	203,564	29,765	392,734
1973.....	13,217	35	24,275	108,466	18,831	144,974	21,801	331,599
1974.....	13,169	316	32,959	103,470	15,641	176,220	36,452	378,227
1975.....	22,370	272	33,397	114,558	11,171	160,784	30,936	373,488
1976.....	22,570	200	38,296	101,599	14,376	200,715	35,092	412,848
1977.....	24,302	1,786	29,546	99,119	13,064	178,533	36,978	383,328
1978.....	19,754	170	32,245	126,232	13,075	201,829	33,806	427,111

Source: Calculated from Appendix Tables 1, 8, 9, 10, 11 in the following manner. Stocks carried in from the previous year by farmers and wholesalers (Appendix Tables 7 and 8) plus quantity produced in the U.S. in a given year (Appendix Table 1) plus quantity imported into U.S. in a given year (Appendix Table 10) minus quantity exported from U.S. in a given year (Appendix Table 9) minus stocks held by farmers and wholesalers at the end of the given year (Appendix Tables 7 and 8).

[a/] Chewings and red fescue

Year	Fescue[a/]	Bentgrass	Merion Kentucky Bluegrass	Other Kentucky Bluegrass	Tall Fescue	Orchard-grass	Annual Ryegrass	Perennial Ryegrass
	dollars per 100 pounds							
1957	31.26	24.00	83.00	-	9.40	16.39	4.40	5.10
1958	31.53	22.50	119.00	-	13.50	23.46	7.80	9.10
1959	27.19	22.00	115.00	50.00	18.04	34.00	5.50	9.80
1960	16.45	28.00	86.00	33.00	12.50	24.20	3.50	6.60
1961	14.50	27.50	70.00	31.10	12.00	26.00	3.95	5.50
1962	14.87	44.50	55.00	29.00	15.00	31.00	4.35	5.10
1963	32.87	48.00	85.00	32.00	18.50	28.50	5.90	6.30
1964	34.40	33.50	104.00	29.70	10.00	21.70	4.15	5.90
1965	42.26	41.50	114.00	36.50	10.00	21.50	4.20	10.00
1966	25.50	25.50	60.00	34.50	8.50	19.70	4.60	10.00
1967	19.23	35.00	38.00	29.40	9.90	20.50	5.85	7.95
1968	21.47	36.50	42.50	28.50	13.50	26.75	7.00	10.70
1969	24.46	50.00	90.00	25.50	18.50	25.80	7.30	11.50
1970	32.25	47.00	135.00	33.00	12.20	25.05	5.70	11.16
1971	28.50	49.00	72.50	30.00	10.60	25.00	4.50	11.60
1972	33.50	42.00	80.00	31.00	18.00	24.00	5.50	16.40
1973	56.50	54.00	127.00	75.40	25.00	36.00	13.20	28.00
1974	30.50	40.00	64.00	37.00	15.00	34.00	15.10	25.00
1975	23.80	44.00	77.00	30.35	13.60	28.00	10.20	17.00
1976	38.50	79.00	118.00	50.00	23.30	32.00	13.50	26.00
1977	53.50	95.00	120.00	80.00	32.00	35.00	10.00	33.00
1978	58.00	125.00	155.55	65.30	27.00	42.00	10.00	33.00
1979	73.00	200.00	67.70[b/]		26.00	45.00	9.80	43.50

Source: Oregon State University Extension Service and Oregon Crop and Livestock Reporting Service, ESS, USDA, cooperating [10].

[a/] Chewings and red fescue.

[b/] Termination in separate reporting of Merion Kentucky bluegrass from all Kentucky bluegrass.

Appendix Table 13. Estimate of Average Annual Price Received by Oregon Seed Wholesalers for Cool Season Grass Seed by Seed Type, 1958-1976[a/]

Year	Fescue[b/]	Bentgrass	Merion Kentucky Bluegrass	Other Kentucky Bluegrass	Tall Fescue	Orchard-grass	Annual Ryegrass	Perennial Ryegrass
	dollars per 100 pounds							
1958	32.00	23.00	130.00	-	15.00	33.20	7.80	9.10
1959	27.19	22.00	125.40	50.00	20.16	34.00	5.50	9.80
1960	17.97	28.00	95.00	33.00	14.49	30.40	4.50	7.70
1961	17.36	27.50	87.40	33.28	12.60	30.40	5.05	5.77
1962	16.95	67.38	63.29	32.23	26.60	31.50	4.77	5.88
1963	34.57	54.49	98.13	37.38	19.88	38.00	5.78	7.09
1964	40.75	42.77	119.15	33.51	12.30	27.00	4.56	7.02
1965	45.99	45.48	116.77	38.00	12.12	28.00	4.57	11.57
1966	25.57	54.49	98.13	37.38	19.88	38.00	5.78	7.09
1967	20.97	54.13	41.67	26.81	11.50	22.50	6.63	8.55
1968	23.46	59.21	48.50	27.48	16.00	26.00	8.50	14.00
1969	28.24	66.40	85.34	28.27	21.50	30.00	8.54	12.75
1970	39.34	52.00	165.00	37.19	15.00	29.00	7.07	13.00
1971	32.00	51.00	77.50	32.00	12.50	27.50	5.00	13.50
1972	37.50	44.00	83.00	34.00	21.00	26.00	6.50	17.00
1973	55.00	55.00	135.00	90.00	32.00	40.06	18.95	49.00
1974	36.00	45.00	100.00	40.00	25.00	38.00	20.00	40.00
1975	30.00	28.00	70.00	35.00	20.00	30.00	12.00	20.00
1976	40.00	65.00	120.00	45.00	25.00	34.00	15.00	30.00

Source: Prepared from data provided by selected Oregon grass seed processors.

[a/] In some instances, price reported by grass seed wholesalers for various seeds from 1958 to 1961 were the same as farm prices. This situation arose where wholesaler records were destroyed for these years, and hence estimation was required. These estimates may well be biased.

[b/] Chewings and red fescue.

Appendix Table 14. Retail Prices Paid by U.S. Farmers for Selected Cool Season Grass Seed as Reported on April 15, 1967-1980

Year	Orchard-grass	Tall Fescue	All Kentucky Bluegrass	Annual Ryegrass
	dollars per 100 pounds			
1967	34.90	19.30	65.90	13.50
1968	33.70	21.30	59.60	15.40
1969	40.60	28.50	59.40	17.60
1970	41.70	32.00	60.90	18.30
1971	42.50	26.00	66.90	17.70
1972	38.80	24.50	65.20	17.20
1973	46.10	39.20	70.90	21.30
1974	65.60	43.50	162.00	49.00
1975	63.00	35.00	107.00	34.90
1976	53.00	32.50	92.00	28.00
1977	62.00	47.50	147.00	35.00
1978	70.00	62.00	165.00	32.00
1979	85.00	40.00	155.00	32.00
1980	95.00	49.50	170.00	35.50

Source: Agricultural Prices (reported in April), Crop Reporting Board, ESS, U.S. Department of Agriculture, Washington, D.C. [13].

Appendix Table 15. Supply (U.S. Production Plus Imports) of Cool Season Grass Seed in U.S. Markets by Consumer Use Class, 1959-1979

Year	Lawn and Turf grasses[a]	Pasture and Cover-crop grasses[b]	Ryegrasses[c]	Total
	1,000 pounds			
1959	85,400	47,753	182,703	315,856
1960	73,010	55,865	150,070	278,945
1961	46,428	54,131	136,365	236,924
1962	58,075	48,507	180,946	287,528
1963	60,554	54,547	145,816	260,917
1964	66,963	82,277	179,902	329,142
1965	70,600	73,842	161,205	305,647
1966	74,525	95,425	152,234	322,184
1967	78,995	63,478	137,237	279,710
1968	74,666	70,539	154,130	299,335
1969	73,064	77,813	190,739	341,616
1970	77,690	93,429	219,167	390,286
1971	92,511	101,459	265,557	459,527
1972	85,663	109,767	212,018	407,448
1973	80,131	152,626	210,199	442,956
1974	94,029	119,895	220,144	434,068
1975	72,955	133,644	226,958	433,557
1976	76,755	98,603	228,196	403,554
1977	57,568	118,504	272,101	448,173
1978	73,502	185,286	241,734	500,522
1979	67,257	112,114	246,702	426,073

Source: Supply calculated by summing production (Appendix Table 1) and imports (Appendix Table 10) for each consumer use class.

[a] Fine fescues, bentgrass, Merion Kentucky bluegrass, and other Kentucky bluegrass.

[b] Orchardgrass and tall fescue.

[c] Annual and perennial ryegrasses.

Appendix Table 16. Disposition (U.S. Consumption Plus Exports) of Cool Season Grass Seed in U.S. Markets by Consumer Use Class, 1959-1978

Year	Lawn and Turf Grasses[a]	Pasture and Cover-crop Grasses[b]	Ryegrasses[c]	Total
	1,000 pounds			
1959	91,441	52,258	135,837	279,536
1960	59,914	48,759	163,505	272,178
1961	52,424	57,876	141,680	251,980
1962	62,629	51,034	185,560	299,223
1963	66,056	49,138	142,740	257,934
1964	70,479	75,019	176,557	322,055
1965	65,248	74,585	162,799	302,632
1966	71,765	81,713	160,003	313,481
1967	73,177	79,168	153,525	305,870
1968	75,477	75,173	147,988	298,638
1969	59,587	68,440	182,377	310,404
1970	97,902	89,551	200,234	387,687
1971	87,795	107,621	242,546	437,962
1972	86,731	110,328	254,277	451,336
1973	66,409	131,739	194,231	392,379
1974	77,973	122,220	228,518	428,711
1975	79,047	129,512	208,643	417,202
1976	86,898	120,366	254,494	461,758
1977	76,792	120,479	239,338	436,609
1978	70,387	148,290	258,920	477,597

Source: Disposition calculated by summing U.S. consumption (Appendix Table 11) and exports (Appendix Table 9) for each consumer use class.

[a] Fine fescues, bentgrass, Merion Kentucky bluegrass, and other Kentucky bluegrass.

[b] Orchardgrass and tall fescue.

[c] Annual and perennial ryegrasses.