

AGRICULTURE

Seaweed Comes to the Land

Recently, with the growth of scientific understanding of these primitive, yet mineral-rich plants, seaweed meal as a nutritive additive has caught the fancy of the American farmer.

By RICHARD LITELL

► PLANTS FROM the sea are helping farmers raise better livestock and grow better crops.

Widely distributed throughout the earth's 329,000,000 cubic miles of salt water are some 17,000 species of seaweed.

Many of these weeds have been used by men of many lands and many civilizations for centuries and even millenia, chiefly as animal fodder, fertilizer and food.

Some seaweeds are said to have been considered of medicinal value in the Orient in the time of Shen Nung, as far back as 3,000 B.C., and even today seaweed is enjoyed as a substantial part of the vegetable diet of many Oriental countries.

Only comparatively recently, however, with the growing awareness of its nutritive potential, is seaweed finding rapidly growing use in this country as an additive for fodder and fertilizer.

Seaweeds may be just weeds in the ocean, but on land they have become highly regarded plants, recognized as being extremely rich in vitamins, minerals and amino acids.

Most of the seaweeds belong to a group of lower plant life known as algae, and they range in size from microscopic single cells to huge plants, longer even than the giant redwoods are high.

The algae, which differ from higher plants in that they do not possess true roots, stems or leaves, are commonly classified by colors. Four groups—green, blue-green, red and brown—are recognized. Only the brown and red are presently of economic importance.

Algae and Seaweeds

The brown and red seaweeds may grow in the same geographical areas but, generally, the browns flourish in cold water while the reds grow most abundantly in warmer, deeper waters.

Sea water, comprising 70.8% of the earth's surface, is the final collector of all mineral run-off from the land and contains at least 49 of the earth's 102 elements.

Small wonder then that this exceptionally rich life-supporting medium gives rise to equally rich plants.

The composition of seaweed differs considerably from that of land plants. When seaweed is burned, its ash content, for example, is much higher than that of land plants. A high ash content is favorable in a fertilizer but less desirable in a fodder. In the latter, it should not exceed 16.5%.

Vitamin content is especially high, while fat and protein content is about the same as for vegetation generally. Seaweed is rich in carbohydrates, but these differ from those found in land vegetation.

Seaweed products may be divided into two groups, derived and natural.

Derived products, chiefly colloids, are used primarily as thickeners, gelling agents and film firmers, and can be combined with foods without impairing their flavor. Specific uses include stabilizing icings, chocolate milk and ice cream; gelling desserts and starch-base milk puddings; thickening cosmetic and medicinal creams, and providing roughage in medicinals, breakfast foods and bakery products.

The U. S. sales volume of colloids jumped from \$2,000,000 in 1945 to \$10,300,000 in 1955, and the projected level for 1975 is \$20,000,000.

But although the derived products are of primary economic value, the products for which the demand has grown rapidly in this country are the natural products—animal food and fertilizer.

It was the natural products that were used by the ancients and it is the natural products that are finding increased application here because modern science is helping to find out what seaweeds are made of and how their ingredients can best benefit other forms of life.

In this country, seaweed meal, or kelp meal as it is generally called, is being used as fertilizer and fodder additives by farm-

ers of all sorts, as well as raisers of cattle, hogs, cows, chickens, turkeys, horses, mink and sheep. Results, although largely unofficial, are encouraging, even startling.

(Although in Europe the ashes of seaweeds are called kelp, it is generally the larger brown seaweeds, as well as their ash, that are referred to as kelp in this country.)

Chief U. S. and only nation-wide supplier of kelp meal is the Algit Norwegian Kelp Meal Co. of Chicago. Its meal is made from a specific species of brown seaweed, *Ascophyllum nodosum*, found along the Norwegian coast and harvested there under strict Government supervision.

This meal is said to contain 5.7% proteins, 2.6% fats, 58.6% nitrogen-free extract matter, 10.7% moisture and 15.4% ash. It also contains vitamins A, B-1, B-2, B-12, C and seven other vitamins, in addition to 21 amino acids.

But it is the high mineral content that is the important property. Sixty mineral and non-mineral elements, from silver, aluminum and gold to sulfur, tungsten and zinc, are to be found in the meal.

Seaweed for Mink

In an experiment with 200 Royal Pastel mink, Dr. John A. Miller, head of the zoology department at Ohio State University, and Thomas F. Daly of the same department, reported that addition of one percent kelp meal to a standard ranch ration resulted in a saving of 1,228 pounds of food for mink over a 135-day period—a nine percent saving.



HARVESTING SEAWEED—Seaweed harvester gathers sun-dried masses of brown seaweed (*Ascophyllum nodosum*) from the rocks along the rugged coast of Norway. Spread there to dry to 20% water content, the seaweed is subsequently cleaned, partially desalted and then ground into a meal for use as a fodder and a fertilizer additive.

The kelp-fed mink weighed 5.3 ounces more per mink and averaged 1.1 inches more in pelt length than control mink. Pelts from the kelp-fed mink were valued at three to four dollars more per pelt.

In other words, the kelp-fed mink gained more pounds on less food and produced larger pelts of greater value than mink fed the identical diet without kelp.

Dr. Miller has stated that Norwegian kelp is "far superior to domestic in amino acids, minerals and vitamins." This is probably due to a combination of factors—the mineral-carrying Gulf Stream, the fiords feeding in mineral runoff from the land, the constant temperature, and regular harvesting under Government quality control.

Although few other officially published experiments as yet attest to the high nutritive value of kelp meal in this country, scores of unsolicited reports tell of some of the remarkable results achieved with kelp.

—About 100 leading horse stables, such as Maine Chance, owned by Elizabeth Arden, and Danada, use kelp as feed additive.

—A Pennsylvania chicken farmer found that laying hen mortality decreased, egg size increased, and cecal worms decreased after three months on two percent kelp meal.

—A 35% to 50% increase in commercial tomato yield was noted by a Maryland farmer who fertilized his crop normally and mulched with kelp meal.

Controlled Experiments Made

A number of controlled experiments with seaweed meal are currently in progress. Among the investigators are Dr. Cecil Howes of Virginia Polytechnic Institute (poultry); Dr. Damon Catron, Iowa State College (swine); Dr. William J. Tyznik at Ohio State (ruminants), and Dr. T. L. Senn of Clemson Agricultural College (horticulture).

Exactly how kelp meal accomplishes its beneficial results is not known. Some scientists are convinced of the presence of an unknown growth factor in addition to the vast storehouse of vitamins and minerals.

Not having a particularly great caloric value, kelp is not a feed or fertilizer in itself, but merely a nutritional additive.

The Algit Company makes no claims, only points to the results. And the results are telling the story. The firm sold 1,500 tons of kelp meal last year, and so far this year they have more than tripled that figure.

A world growing at the rate of 5,400 persons per hour, which has been warned that it must look increasingly to the sea as a source of food, would do well to honor the "lowly" seaweed. It will have a big role to play.

Science News Letter, May 2, 1959

Do You Know

Scientists are studying the shape of the nucleus of an *atom* by bombarding gold and tantalum atoms with X-rays.

The disease *diabetes* was first described 3,500 years ago.

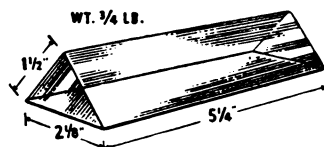
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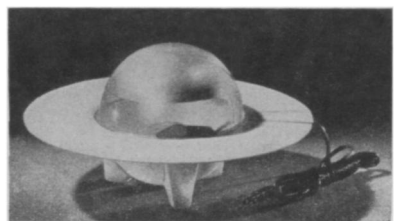
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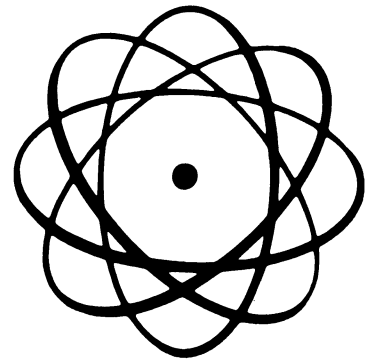
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