

AGRICULTURE IN THE TROPICAL ISLANDS FOR THE YEAR AND MONTH

The following report has been issued by the United States Department of Agriculture.

The following letters from Governor Sanford B. Dole and Mr. Franz Buchholz of South Kona, Hawaii, give descriptions of the varieties of fruit, vegetables, etc., which are grown on the island of Hawaii.

Puuwaawaa, Kona, Hawaii, August 12, 1901.

Dear Mr. Stubbs: While on this island I visited Mr. Buchholz, a coffee planter of the extreme southern part of South Kona. His house is on the Government road at that place, at an elevation of perhaps 1,500 feet above the sea. His plantation is from the road running up the slope. The soil is among broken lava and generally washed below the surface of the ground, which is composed almost entirely of broken black lava from the size of a walnut to that of an apple or larger.

Mr. Buchholz has had scientific training in agriculture in some German institution and is always experimenting in fruits, vegetables and grasses. In fact, he is conducting a private experimental station which I deem to be of great importance, and he keeps careful accounts and records of each experiment, his experience is available through his courtesy to the public.

I found growing on his place coffee, figs, grapes, fruit trees (of the United States), pineapples, coconuts, avocados (St. John's bread), papaya, water lemon vine, and a good variety of roses and other garden flowers. All of these were growing vigorously, and the coffee, fig, grape, mango, papaya, apple, pineapple and water lemon were bearing fruit. The plantation is surrounded by native forest.

At my request Mr. Buchholz has kindly consented to prepare a statement of his experiments for you, which I will forward as soon as I receive it. In North Kona, at the place of Mr. Cooper, also a German, I picked and ate fine apples from his trees. He has abundant crops every year, though his trees are as yet young and small.

North and South Kona stretch for sixty miles or more under the lee of the great mountains of Hawaii, which from these districts, in places of them they have land breezes at night and sea breezes by day, both of which are little more than zephyrs. Sometimes the sea breeze is augmented by an eddy of the trade wind, and then blows with more force and from a more northerly direction. This region is made up almost entirely of lava flows, some of them very ancient, so that considerable soil is formed from the decomposition of lava and the contribution of vegetable growth. The rainfall throughout the year is perhaps more evenly distributed than in the case in any other part of the islands. The soil is rich and fine.

For these reasons the Kona is probably the most suitable part of the islands for the production of fruit and perhaps tobacco, though the soil may be too rich for the production of a good quality of the latter. Tobacco grows wild here as well as in other parts of the islands.

I am now at Mr. Low's ranch house, over 2,000 feet elevation, on the slope of Hualala. The ranch is all lava flows and contains extensive forests of a large variety of trees, and produces first-class pasturage of a considerable variety of grasses and other herbage. Alfalfa, rice grass, and blue grass have been successfully introduced and stand cropping. There is no water, and the stock eat enough while the dew is on the grass to supply their wants. At the ranch house and a few hundred feet higher up in elevation, Mr. Low has planted a variety of northern fruits, and budded oranges and olives. All are doing well—the apples are beginning to bear, and all the olives, one variety of the latter being covered with flower buds. Figs do well here.

The native forests on the ranch are dying. The cause is doubtful. I have examined with Mr. Low a number of trees. We have found six or seven kinds of borers, bugs and worms in the (dying) trees, but have not found any in healthy, growing wood. Whether these pests cause the destruction or only follow on its heels, I do not know, but am inclined to the latter theory. I shall try to have Mr. Koebel come here and investigate. Mr. Low will prepare a paper, as requested by you, which will be forwarded to your address.

In regard to the subjects of inquiry set forth in your letter of instruction from Washington, I would say as to the first point—leaving out the consideration of sugar, rice and coffee—nearly all edible vegetables of good quality can be produced from the sea level to over 2,000 feet elevation; some doing better low down and others high up. Certain vegetables, like cauliflower and celery, seem to require the cooler climate of elevated places.

Maize grows to perfection from the sea level to over 2,000 feet elevation. The same is true of the majority of forage plants. Wheat, oats and barley do well, but the wheat product is of too poor quality to compete with imported flour. None of the cereals are cultivated at the present time, except perhaps in a small way, as forage.

Hay can be easily raised, but owing to the liability of rain in the localities where it can be grown, it is liable to be spoiled in the curing process. There are some localities where it could be safely cured if it could be raised with the assistance of irrigation. Irrigation, however, is too valuable in the raising of more profitable crops, such as sugar and rice, to allow it to be used in growing hay. Experiments already made would justify the belief that nearly all of foreign grasses will do well over a wide range of elevation and will stand grazing.

Of the fruits of temperate climes, it is fairly well established that apples and some of the berries will thrive and bear at the right elevations. I do not think that this is settled as to other Northern fruits, although pears have been known to produce fruit. The peaches that can be successfully produced are an oriental variety, which has been cultivated here for fifty years, and the Cayton peach, which has been brought from Florida and cultivated for perhaps ten years.

It has been found difficult to raise some of the tropical fruits in these islands, especially those which belong to such extremely tropical regions as Java, Sumatra, and similar localities; yet both the durian and the mangosteen have been produced on the island of Kauai, as I understand producing regular annual crops.

Native fruits are limited as to kinds. The banana stands at the head as to importance, with several well-marked varieties, especially those which are delicious when eaten fresh and cooked. The banana used for export is an exotic, generally called the Chinese banana. It

bears large bunches on low plants so well provided with roots that neither the weight of the bunch nor high winds will prostrate it, whereas the indigenous varieties are easily blown over. The Chinese banana ripens well if cut green, and is suitable for cooking.

Except the banana title has been gone in the way of raising fruit for profit. The natives in Kona raise quite a quantity of seedling oranges of fine quality, many of which are brought to Honolulu and sold. Little attention, however, is paid to the cultivation of oranges, and the fact that oranges of such excellent quality are produced from trees substantially in a wild state promises well for the future of the Hawaiian production of this fruit.

I am very much interested in the prospect of the establishment of an experimental station here, which an enterprise could not fail to be of vast benefit to the small farming interests of this Territory. If such stations were located at places where they might be conveniently visited by those interested in the experimental work, the results of such work would, it seems to me, better and more forcibly reach those whom it is desired to reach than in any other way. Present monthly bulletins would be very useful and would reach many who could not often visit the stations.

Very sincerely yours,
SANFORD B. DOLE.

Buchholz Plantation, Hoopuloa, S. Kona, Hawaii, August 28, 1901.

His Excellency Governor Dole, Honolulu. Mr. Governor: There appears to be no limit as to the growth of any vegetables, fruit trees, grapes, etc., in this district; all of them do well and a great many bear fruit the whole year round. I have grown the following kinds:

Potatoes, four times in succession on the same piece of land within twelve months, at an expense of one-half cent per pound, average. I got two large and two small crops, according to the season.

Cabbage grows the whole year round, appearing to make no difference if planted in summer or winter, in spring or autumn. The cabbage grows to an enormous size, as big as 2 feet in diameter, and has the quality to rot soon. For a year in succession, after the first head is cut off, small heads spring up out of the stump which, although not as hard as the first one and of no use for market purposes, make just as fine eating. Cauliflower grows in the same manner as cabbage, and ratons in the same way.

Kohl-rabi, or turnip-rooted cabbage, once planted may remain growing for a year or longer without becoming stringy or woody. Brussels sprouts grow well, but I cannot judge how it would do, because when it just started to form the little heads my turkeys ate it up, and I had no chance to plant again. Artichokes grow much slower than the above-mentioned vegetables, which become eatable within three months, whereas artichokes do not develop in less than nine months, but they continue to deliver flower heads for four to six months. Parsnips grow very well, maturing ever apparently; mine is now 4 years old. Parsnips may remain in the ground for a year or longer without becoming woody, and can be eaten within two months after planting. Celery, both the turnip rooted and the blanched, grows well. The latter, however, is preferable, as it is very nice and crisp all the time, whereas the first is liable to become stringy. Celery may be planted in the ground until you wish to use it, a year or longer apparently makes no difference, if properly attended to. Carrots grow the whole year round, and may also remain in the ground until needed.

Red beets, the same as above. Lima beans continue to bear and grow for over a year; have to be gathered every week after starting to bear. All other kinds of beans grow very well, maturing within three months after planting. Turnips grow all the year round, and may remain for a long time in the ground, but I am unable to tell how many months. Cucumbers grow the whole year round, and, particularly the climbing kinds, bear for a long time. Tomatoes grow the whole year round and bear, with proper attention, for years. Peas yield very small crops, but grow very quickly, and may be planted at different times of the year. Corn can be planted with success any time in a year and does not then yield as good crops here as in other parts of the country. Onions grow very well, are of a fine quality, and very large size; may be planted any time of the year, mature in about six to seven months; can be raised at one-half cent per pound. Leeks grow very well; may remain for a year in the ground. Radishes become eatable ten days after sowing. Eggplants do as well as the rest and bear for a long time. Lettuce can be planted any time of the year; it develops very quickly. Peppers grow in profusion and bear the whole year round and for many years in succession. Watermelons do not do well at this locality (1,500 feet), but no doubt would grow very nicely lower down, where it does not rain so much. Muskmelons grow very well, but rather greatly from a little fly. Pumpkins and squashes do very well and sometimes bear for two years. The fruit was to be gathered every month. Strawberries bear fruit all the year round, of a fine flavor. Raspberries bear fruit during perhaps six months, also of a very fine flavor. Gooseberries and currants grow rather slowly, and have so far not been in bearing; gooseberries apparently do better than the latter. Two-year-old apple trees imported last year from California are in bearing this year and yield a fine-flavored, juicy fruit. Pears grow slowly, but apparently well; walnuts, the same. Olives grow very well. Sweet almonds planted last year were in flower this year and do very well. Plums, prunes, cherries, peaches, and apricots planted last year did remarkably well, and if they had not been for the drought last winter would have been in bearing now. I presume. Oranges and limes grow rather slowly in the beginning, but do very well afterwards. Alligator pears grow well. Wine grapes bear twice in a year and do very well. Figs bear within a year after planting, and bear in abundance during four months every year after. Pineapples start bearing eighteen months after planting and bear every year regularly for years to come.

Sweet herbs, all, lavender, majoram, sage, thyme, all do well. Peppermint grows like a weed.

Mangoes and papayas grow very well and bear a better-flavored fruit than in other places. St. John's bread and Sappodillo plum grow very well.

Of ornamental and useful trees I have planted the following: all of them growing very well: *Grevillea robusta*, iron-wood, Jacaranda, date palms, cedar, scacia, kamona, bogie, *Dracaena draco*, calabash tree, rubber vine, cacao, vanilla beans, camphor, castor beans.

Coffee and sugar cane grow very well here. Wheat, barley, and oats come to maturity and bear well, but my place is too rocky to allow of plowing, and I have only experimented to find out what could be done.

Alfalfa, burr clover, red clover, orchard clover, Australian rye grass, orchard grass, buffalo grass, and Kentucky blue grass I have sown, and all of them do well and make fine pasture. Australian saltbush I have also tried on the rocks below with good success.

Looking the list over which I have given, it appears that almost everything a man may think of will grow in this district. All the mentioned fruits, vegetables, grasses, etc., I have grown myself and very successfully here, and anyone who cares to find out if I have reported facts may come and have a look himself.

It is my opinion that with good roads and proper transportation facilities this district of Kona has a great future, but there are a great many drawbacks which make progress here very slow. In the first case the very high steamer charges make it almost impossible to grow anything profitably, although things grow here certainly as luxuriantly and abundantly as anywhere else; second, by the commissions and profits which the Honolulu middleman insists on making. No one in Honolulu is satisfied with a profit of 20 per cent, and they do not work at less than 100 to 200 per cent. For instance, onions are never bought for less than 4 to 5 cents per pound, but the most I was offered was 1 1/2 to 2 cents per pound. I had the same experience with Lima beans, corn, etc., and I have therefore almost given up raising anything except for my own use.

METEOROLOGICAL SUMMARY

For the Month of April, 1901.

Temperature mean for the month, 73.6 Fahrenheit; normal, 72.5; average daily maximum, 79.5; average daily minimum, 67.8; average daily range, 11.7; greatest daily range, 15 degrees; least daily range, 7 degrees; highest temperature, 84 degrees; lowest, 62.

Barometer average, 29.999; normal, 29.920; corrected for gravity by 0.001; highest, 30.13; lowest, 29.81; greatest 24-hour change, 0.11. "Lows" passed this point on the 9th, 22d and 27th. "Highs" on the 4th, 16th and 20th. Pressure the first half of the month about normal; during the last half, below the normal.

Relative humidity, 72; normal, 71.5; mean dew point, 63.3; normal, 63.3; mean absolute moisture, 6.45 grains to the cubic foot; normal, 6.42.

Rainfall, 3.11 inches; normal, 3.01; rain-record days, 18; normal, 17; greatest rainfall in one day, 0.75; T. at Kaplani, 11.40; at Kaplani Park, 9.95. Total rainfall since January 1, 15.29 inches; normal, 14.30.

The artesian well level fell during the month from 34.30 to 34.00 feet above mean sea level. On April 30, 1900, it stood at 34.30.

Tradewind days, 22 (five of N. N. E.); normal number of tradewind days for April, 20. Average force of wind, Beaufort scale, 2.31; cloudiness, tenths of sky, 5.4; normal, 5.1.

Approximate percentages of district rainfall, as compared with normal: Hilo, 89 per cent; Hamakua, 35; Kohala, 100; Waimea, 110; Kona, 100; Kau, 130; Puna, Maui, Oahu and Kauai, about normal.

Average temperatures: Pepeekeo, Hilo district, 100 feet elevation, average maximum, 75.9; average minimum, 66.6; Waimea, Hawaii, 2,730 elevation, 74.6 and 62.8; Kohala, 521 elevation, 78.0 and 68.1; Kulaokahua, W. R. C. table, 60 feet elevation, highest, 84; lowest, 65; mean, 73.4.

An electric storm traveled through the group on the 28th, passing over Oahu at 6 a. m., and reaching the Island of Hawaii at 10 a. m., showing the rapidity and direction of such disturbances in the upper stratum of air. Thunder and lightning on Hawaii, 29th and 30th. Snow fell on Mauna Kea on the 28th. Earthquakes at Hilo, 16th and 26th, at 2:55 and 3:45 a. m., respectively. Heavy swell on 1st, 9th and 26th.

CURTIS J. LYONS,
Meteorologist.

RAINFALL FOR APRIL, 1901.

Stations— HAWAII—

Stations—	Elev. (Feet.)	Rain. (Inches.)
Waiakea	50	12.85
Hilo (town)	100	12.28
Kaunakakai	1250	17.31
Pepeekeo	100	8.94
Hakalau	200	2.90
Honohina	500	6.16
Laupahoehoe	500	6.16
Ookala	400	2.88
Kukaiua	250	4.31
Panauhau (Moore)	300	2.24
Panauhau (Greig)	300	2.78
Honokaa (Mur)	425	2.78
Honokaa (Rickard)	1800	2.18
Kukuihaele	700	4.95
Awini Ranch	1100	6.62
Niuli	200	6.62
Kohala (Parsonage)	350	3.59
Kohala (Mission)	585	5.04
Kohala (Sugar Co.)	234	3.82
Waimea	2720	4.51
Hawi Mill	900	4.51
Hawi Mill	200	4.51
Kailua	950	8.96
Kealakekua	1580	3.23
Napooopo	25	3.23
Naahehu	650	1.92
Naahehu	1350	3.10
Naahehu	1725	3.10
Honouapo	15	3.10
Hiloa	310	3.10
Pahala	850	6.78
Moaula	1200	6.78
Volcano House	4000	6.78
Olaa (Russell)	1700	6.78
Kapoho	110	6.65
Kalapana	8	6.65

MAUI.

Waioape Ranch	700	2.65
Kaupo (Mokulua)	285	8.34
Kipahulu	300	14.21
Hamaon Plantation	60	6.08
Nahiku	60	10.78
Nahiku	900	2.13
Haku	700	1.24
Kula (Erehwon)	4500	2.51
Puomalei	1400	1.10
Pala	180	6.65
Haleakala Ranch	2000	6.65

LANAI.

Keomoku	6	6.65
---------	---	------

OAHU.

Punahou (W. Bu.)	50	3.11
Kulaokahua	50	2.15
Kewalo (King St.)	15	2.20
U. S. Naval Station	6	0.96
Kaplan Park	10	6.49
Manoa (Woodlawn D.)	285	3.31
School St. (Bishop)	50	3.28
Insane Asylum	30	3.41
Nuuanu (W. W. Hall)	50	3.29
Nuuanu (Wylie St.)	250	6.15

Nuuanu (Elee. Str.)	40	4.37
Nuuanu (Luakaha)	50	11.40
Waiananalo	25	2.41
Manawala	50	9.80
Ranohoa	100	5.49
Ahuhimanu	50	4.57
Kahuku	25	2.55
Waialua	20	1.96
Wahiawa	900	3.82
Ewa Plantation	40	0.71
Waipahu	300	0.71
Mogaiwa	15	1.34

KAUAI.

Lihue (Grove Farm)	200	2.13
Lihue (Molokai)	300	3.54
Lihue (Kukui)	1000	6.09
Kailua	15	2.41
Koloa	250	3.90
Koloa	300	8.94
Hanalei	10	4.74
Waialua	32	0.20
Wahiawa	2100	11.20
Eleece	280	0.64

RECORDS NOT HITHERTO PUBLISHED—MARCH, 1901.

Waipae	2.26
Haleakala	13.45
Wylie St.	6.53
Nuuanu Valley (Hall)	4.09
Kulaokahua	3.40
Panauhau	24.09
Kailua	4.57
Pahala	3.20
Puomalei	11.71
Koloa	2.30

CURTIS J. LYONS,
Territorial Meteorologist.

N. B.—Observers are especially requested to forward their reports promptly at the end of each month and to report regularly and continuously.

TOTAL RAINFALL FOR 1901.

Stations— HAWAII—Hilo—

Stations—	Elev. (Feet.)	Rain. (Inches.)
Waiakea	50	111.08
Hilo (town)	100	107.43
Pepeekeo	100	87.15
Hakalau	200	102.06
Honohina	500	113.13
Laupahoehoe	500	100.00
Ookala	400	84.42
Kukaiua	250	72.24
Panauhau (Moore)	300	49.80
Panauhau (Greig)	300	67.80
Honokaa (Mur)	425	58.08
Honokaa (Rickard)	1800	74.25
Kukuihaele	700	62.95
Awini Ranch	1100	73.65
Niuli	200	46.36
Kohala (Mission)	585	45.28
Kohala (Sugar Co.)	234	47.32
Waimea	2720	37.74
Hawi Mill	900	40.55
Kailua	950	56.23
Kealakekua	1580	64.65
Naahehu	650	6.20
Naahehu	1350	17.35
Naahehu	1725	15.32
Honouapo	15	25.32
Hiloa	310	29.00
Pahala	850	34.76
Puna	4000	63.38
Volcano House	4000	80.44
Kapoho	1100	80.44
Pohouki	87.70	75.10
Kalapana	8	55.06

MAUI.

Waioape Ranch	700	15.48
Kaupo (Mokulua)	285	7.00
Kipahulu	300	82.34
Hamaon Plantation	60	61.23
Nahiku	60	100.13
Nahiku	900	59.34
Haku	700	71.99
Kula (Erehwon)	4500	43.97
Puomalei	1400	54.57
Pala	180	20.00
Haleakala Ranch	2000	64.57

LANAI.

Keomoku	6	21.00
---------	---	-------

OAHU.

Punahou (W. Bu.)	50	37.35
Kulaokahua	50	33.21
Kewalo (King St.)	15	29.85
Kaplan Park	10	17.85
Manoa (Woodlawn D.)	285	102.53
School St. (Bishop)	50	46.25
Insane Asylum	30	33.55
Nuuanu (W. W. Hall)	50	43.95
Nuuanu (Wylie St.)	250	69.49
Nuuanu (Elee. Str.)	40	80.65
Nuuanu (Luakaha)	50	129.21
Waiananalo	25	46.68
Manawala	50	79.20
Ranohoa	100	64.21
Ahuhimanu	50	97.41
Kahuku	25	37.21
Waialua	20	15.39
Ewa Plantation	40	15.39
Waipahu	300	30.88
Lihue (Grove Farm)	200	37.20
Lihue (Molokai)	300	64.45
Lihue (Kukui)	1000	22.32
Kailua	15	56.88
Koloa	250	83.93
Hanalei	10	32
Waialua	32	

CURTIS J. LYONS,
Territorial Meteorologist.

SKIN TORTURES

And Every Distressing Irritation of the Skin and Scalp Instantly Relieved by a Bath with CUTICURA SOAP

And a single anointing with CUTICURA, the great skin cure and preserver of exfollients. This is the purest, sweetest, most speedy, permanent, and economical treatment for itching, disfiguring, itching, burning, bleeding, sores, crusts, and pimply skin and scalp humours with loss of hair, and has received the endorsement of physicians, chemists, and nurses throughout the world.



Millions