the plants the vines were parasitized and killed by the fungus, which was apparently developing from the soil surface and possessing well-developed rhizomorphs. The portions of the shoots extending upwards from the place of infection wilted away and caused considerable losses to the growers. Portions of fruits in contact with the soil often rotted due to infection by the fungus. The strands of rhizomorphs crept up the fruit surface and after penetrating the tissue incited a wet rot. Since the sclerotia have been found to be viable for long periods in the soil, the possibility of the fungus building up in proportion and causing immense losses in these economic crops is great. Control measures are being investigated.

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A Method for computing the Optimum Size-Limit for a Fishery

In an exploited fishery, one of the main functions which a properly selected size-limit can have is to ensure that the weight of the yield is the maximum possible, with minimum losses due to unrealized growth or natural deaths. Where all fish reaching the limit are caught, determination of the correct value for the limit to achieve this purpose is theoretically simple, although in practice the basic data regarding growth- and mortality-rates, on which the determination is based, may not be easy to obtain. Such cropping conditions are found only in fish-farming. Normally, in fish stocks subjected to either angling or commercial fishing, only a small proportion of the fish reaching the limiting size pass into the catch. This causes a modification to the optimum value of the limit. Ricker[1] has pointed out that the size-limit must be less under these conditions than when cropping is complete, and has described a method for computing the optimum value when full data regarding growth, natural mortality and cropping-rates are available.

Results of practical value can be deduced from more easily obtainable data by making use of the property that, when the limit is at the optimum value, a very small change in the limit does not cause the size of the total catch to alter. A fish stock can be considered to consist of a number of groups of fish all of which are of the same size at any instant. Assume that cropping begins at the time T when the number of fish in the group which is just passing the limit is N, and that a fraction K of these fish are afterwards caught and have at time of capture a mean weight V, then the total weight of the crop obtained from these fish is KVN. If the cropping point is now made earlier by an interval $\mathrm{d}t$, then the number of fish in the group at the cropping point will now be $N + \mathrm{d}N$, where $\mathrm{d}N = Nm.\mathrm{d}t$ and m is the instantaneous natural mortality-rate. If the average weight of these fish is W and the instantaneous cropping-rate for fish of this size is c, then when the time T has been reached, $Nc.\mathrm{d}t$ will have been caught weighing $WNc.\mathrm{d}t$. The number of survivors to time T is therefore now $N - Nc.\mathrm{d}t$. Since there is no reason for supposing that the conditions under which they are cropped have been changed, these survivors will give a yield of $KVN(1 - c.\mathrm{d}t)$. The total crop from the original group when cropping begins at $T - \mathrm{d}T$ is therefore $KVN(1 - c.\mathrm{d}t) + WNc.\mathrm{d}t$. When T is the point of commencement of cropping for maximum yield, this equals KVN and therefore:

$$KVNc.\mathrm{d}t = WNc.\mathrm{d}t,$$
$$\text{or } W = KV.$$

Thus, when the limit is that which gives the maximum yield, the weight of the typical individual fish at the limit is the product of the average weight of fish in the catch and the proportion of the fish passing the limiting size which are ultimately caught. Since this applies to each group in the population, it applies also to the population as a whole.

These two statistics are relatively easily measured in practice where adequate catch data are obtainable, the former by direct weighing of a sample of the catch, and the latter by obtaining recapture records for fish marked and liberated at the limiting size. The testing of the correctness of an existing limit can be done directly from these two measurements. If an existing limit is found to be incorrect, a first approximation to the correct value is immediately obtained. This approximation is subject to errors caused by the effect of the existing limit on both V and K. In many cases the original catch data will be in a form which will allow fairly accurate evaluation of V for a proposed new limit, and some indication of the effect on K may also be obtained. Application of these corrected values, if necessary in more than one step, should often enable a value of the optimum limit to be obtained which would be sufficiently accurate for experimental trial.

An estimated value cannot be obtained from data based on an existing limit if K is equal or close to unity, since in this case the average weight of the fish caught is automatically equal to the weight of a fish of the limiting size, and the approximation obtained is equal to the existing limit.

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A Suggested Alternative to the Correlation Coefficient for testing the Significance of Agreement between Pairs of Time Series, and its Application to Geological Data

It has for some time been realized that the ordinary test of significance of the correlation coefficient cannot be applied indiscriminately to pairs of time series, since serially adjacent observations are not in general independent. Tests of significance of the correlation coefficient have therefore been developed which are designed to make allowance for the effect of autocorrelation[1].

An alternative measure of agreement, which sacrifices some of the advantages of the correlation coefficient for the sake of simplification of the necessary test of significance, is proposed here. It is not a dimensionless quantity, and therefore it can only be used with pairs of time series which have approximately the same mean and variance. (This