Ranganath, H.A. and N.B. Krishnamurthy. University of Mysore, Manasagangothri, India. Competitive coexistence is not an invalidation but an extension of the Gause principle.

Competition studies have been made between two sibling and sympatric species, D. nasuta and D. neonasuta, following the procedure of Ayala (1965). Polymorphic and monomorphic strains of both the species were employed in the experiments. In all the cases D. neonasuta was eliminated. Table 1 gives the genotype of the competing species and time of elimination of D. neonasuta. The population dynamics of these two species in pure and mixed cultures will be presented elsewhere.

In the light of the above findings, the authors are tempted to draw certain interesting conclusions. Ayala (1970) has suggested that the niche of a species includes all its relationships to the physical (temperature, light, humidity, food, place to live, etc.) conditions and the biotic (other organisms of the same kind or of different kinds) environment. The functional relationship with these ambient ecological factors determines the functional status of the species in a niche. In a single niche, organisms can have different varieties of functional relationships. For example, the different stages in the life cycle of Drosophila (the eggs, the 1st, 2nd and 3rd instar larvae, the pupae and the imagoes) within a bottle certainly differ in their ecological-functional relationships. The degree of functional relationships can be altered either by changing the genetic constitution of the species or the ecological factors. So functional status of a species is a dynamic character.

Table 1. Results of the competition between D. nasuta and D. neonasuta.

Species	Time of elimination of D. neonasuta in weeks
1 Monomorphic nasuta v/s Monomorphic neonasuta	7 - 8
2 Polymorphic nasuta v/s Monomorphic neonasuta	8 - 10
3 Monomorphic nasuta v/s Polymorphic neonasuta	11 - 15
4 Polymorphic nasuta v/s Polymorphic neonasuta	22 - 27

It is felt that the determination of the ecological niche of a species in general is not important as its functional status in a microcosm. In view of this, Gause principle can be restated as follows: 'Two or more forms with absolutely identical functional status cannot coexist indefinitely in the same environment'.

Let the functional status unit of one species be unity and of the other is 1-s, then no matter how small is s, the less efficient species will be, given enough time, eliminated. By changing the magnitude of the functional status of the competing species it is possible either to shorten or lengthen the duration of their coexistence.

'Time' factor is the central tenet of the Gause Law. It is not possible to predict the time of elimination of any one of the competing species without experimentation. The 1-s should reach a critical and threshold point before one of the species is to be eliminated. It is only a question of time. As the extent of functional status changes due to the alteration either in the genotype or in the ecological factors, the period of elimination also should vary. So it is not possible to forecast the time for elimination of the less efficient species, but only the process can provide this information.

Biological mechanisms attributed by Ayala (1970) for the coexistence of the competing species provide the mechanisms either to alter the functional status completely or their magnitude. If the coexistence is due to the former case, they can do so as there is no clash between them, but in the latter case it is only a question of time. The laboratory experiments of Ayala (1969), which he has used to invalidate the Gause principle fits into our latter explanation. In the competition between D. serrata and D. pseudoobscura, at 25°C D. serrata wins, but at 19°C it is a loser, while at 23.5°C both the species coexist for quite a number of generations. This experiment is a clear indication of the changes in the functional relationship of the species at different temperatures. Further, it suggests, that the observed number of generations at 23.5°C may be insufficient for 1-s to express itself and it requires some more time. The requirement of different lengths of periods to eliminate any one of the competing species is clearly seen in the competition between D. nasuta and D. neonasuta (Table 1). Similarly Park (1954) has demonstrated that the outcome of competition between T. castaneum and T. confusum depends on the amount of food, temperature and relative humidity.

Thus, the competitive coexistence of species for certain number of generations under certain environmental situations cannot invalidate the Gause Law (Neo), as the words 'even-

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Preuss, V. University of Tübingen, Germany. Light-dependent and light-independent mating of D. subobscura.

Successful mating of wild type D. subsbscura depends on light. Springer (1964), however, could obtain a light-independent strain (L1) by selection. In order to investigate the question as to whether or not the elements of courtship are the same in the L1 strain and other strains, flies from a wild type strain, a yellow mutant strain and the L1 strain were observed directly in Elens-Wattiaux observation chambers. The male choice and the female choice method was used. In each individual male choice experiment, 10 males of one strain were brought together with 10 females of the same and 10 females of another strain. For the female choice experiments, 10 females were combined with 10 males of the same strain and 10 males of another. Homogamic and heterogamic matings were registered over an observation time of one hour. During the course of the observations it became clear that most of the matings occured after a significant and pronounced courtship of the males. Such a sort of mating may be called "typical". In some cases, however, matings were performed spontaneously without any proceeding "dance" of the males. These matings may be described as "atypical" matings. The results of the observations are shown in the following table:

MALE CHOICE EXPERIMENT

males	females	matings homogamic typ.	homogamic atyp.	heterogamic typ.	heterogamic atyp.	total number of matings observed
+	+ and y	139	1	123	1	264
L1	L1 and y	30	33	59	52	174
y	y and +	69	--	23	--	92
y	L1 and +	56	3	4	--	63

FEMALE CHOICE EXPERIMENT

females	males	homogamic typ.	homogamic atyp.	heterogamic typ.	heterogamic atyp.	total number of matings observed
+	+ and y	163	5	9	1	178
L1	L1 and y	39	50	8	6	103
y	y and +	30	--	134	6	170
y	L1 and y	31	1	55	54	141

With respect to typical and atypical matings it is rather clear that atypical matings occur almost exclusively in experiments with L1 males. Hence, it may be assumed that this type of courtship behavior of the L1 strain is responsible for its ability to mate in the dark. It can be further seen from the table that yellow males are discriminated by wild type and Li females. Further, L1 males seem to prefer yellow females, while wild type males do not. The meaning of optical signals for the mating display is obviously different for the wild type and the L1 selection strain. It is generally different also for males and females of all strains.

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tually' or 'given enough time' have broad spectrum. The neo-Gause law also helps to account for the sympatric diversity present in the natural populations occupying the heterogenous environments more aptly than the earlier concept.

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