A NOTE ON THE FAUNA OF THE LOWER ORANGE RIVER

J. D. Agnew

ABSTRACT

The faunal analyses of a few snap biological samples from the lower Orange River are presented. These are discussed in the light of previous hydrobiological surveys on other South African catchments and of the future development of the Orange. The need for a greater deal more information is emphasized.

SAMPLING

During December 1960 a few snap hydrobiological samples were collected from the Vaal-Hertz and Orange rivers on a visit to the northern Cape Province. Collections were made at ten different points, but the results described here come from only four of these stations (see Fig. 1) as it was only at these points that fairly representative samples could be collected.

Aquatic samples were collected according to standard procedure using a net with mesh opening of 0.288 mm; these were formalinized in the field and later processed in the laboratory for analysis under a stereo microscope. Unfortunately it was not possible to collect water samples for mineral analysis except for one small sample from Station 3 which gave the following result:

- **pH**: 8.65
- **Total dissolved solids**: 135 mg/l
- **Total hardness**: 65 mg/l (as mg/l CaCO₃)
- **Total alkalinity**: 31 mg/l (as mg/l CaCO₃)

A brief description of the sampling stations as indicated in Fig. 1 is as follows:

**Station 1**: Vaal-Hertz River at Schmidtspunt. Altitude ca 1100m (3600 feet). Current very slow. Sample from submerged grasses and weeds.

**Station 2**: Orange River at Prieska. Altitude ca 915 m (3000 feet). Samples from marginal vegetation in fast current, and from small stones, also in fast current, in a shallow part of the river. Fauna of both habitats dense.

**Station 3**: Orange River at Upington. Altitude ca 800 m (2600 feet). Sample from marginal vegetation in very shallow water with slow current. Fauna poor, possibly due to recent inundation of vegetation.

**Station 4**: Orange River at Onseputs, Altitude ca 290 m (950 feet). Sample from marginal reeds and willows in slow current. Water very turbid. Fauna poor.

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**Figure 1**

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RESULTS
The results of the faunal analyses are pre-
seint in Table I (fauna of stones) and Table II
(fauna of vegetation). In calculating the per-
centage composition the presence of ento-
mothrasaces and fish in the samples was
ignored. Furthermore, the faunal density has
not been expressed numerically as no efforts
were made during sampling to take quantita-
tive samples.

Table I: The Orange River at Station 2. Percent-
age composition of the fauna of shallow stones on
a sandy bottom.

<table>
<thead>
<tr>
<th>Order</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actinopterygii</td>
<td></td>
</tr>
<tr>
<td>Characiformes</td>
<td>83</td>
</tr>
<tr>
<td>Cypriniformes</td>
<td>23</td>
</tr>
<tr>
<td>Loricariiformes</td>
<td></td>
</tr>
<tr>
<td>Ostariophysi</td>
<td></td>
</tr>
<tr>
<td>Perciformes</td>
<td></td>
</tr>
<tr>
<td>Siluriformes</td>
<td></td>
</tr>
</tbody>
</table>

Referring to Table I, it will be seen that the composition of the fauna is dominated by
Simulium larvae, which are probably all,
Simulium gariopenis as ten pupae of this
species were found in the sample and none
of any other Simulium species. Apparently,
S. gariopenis is endemic to the Orange as it
has not been found in the southern and
western Cape (Harrison, Harrison and Ag-
new), Natal (Oakley), southern Transvaal,
and northern and eastern Trans-
vaal (Agnew). A number of ephemeropera-
tine species are present, all of which are wide-
spread in southern Africa with the exception
of Barbus quinquis which has been recorded
once elsewhere in the headwaters of the Vaal
(Agnew). It is likely that these two species are
confined to the Orange system. Centrop-
tiloides bifasciata, a unique carnivorous
beatid that feeds on Simulium larvae, has been
classified by Harrison and Agnew as a
"temperate species preferring alkaline water"
and its presence in the sample is therefore in
accordance with their classification. During
winter months this species occurs at lower
altitudes but it is normally confined to "high-
val" during the summer.

The fauna of vegetation (Table II) is
variable and this may mainly to sensitivity to
current speeds which varied considerably,
from very slow to fast. The fauna here is
much less distinctive, apart from the occurrence
of S. gariopenis discussed above. The great
majority, if not all, of the species are also to
be found elsewhere e.g. in the southern Trans-
vaal. Nevertheless one is struck by the peculiarity
of certain groups e.g. certain trichopterans
to which only a few specimens were present
and are not shown in the Table) and Molluscs.

The reason for this is obscure but it is doubt-
less connected in some way with the as yet
uninvestigated peculiarities of the Orange.

INTERPRETATION
A cursory comparison of the fauna herein
described from the low Orange with that
described by Olifit from the Tugela River,
which lies at comparable altitudes and latitude
on the east coast brings to light further points
which will have to be investigated more sys-
tematically. For example the lithothalpa fauna
from the Tugela contains ephemeropteran
species such as Puncredothemus maculatus and
Barbus harrisi and the generell Elnonurus,
Afromerens and Protospioptoma which are ap-
parently missing from the Orange. This is
perhaps may be said of Notomurus from the
vegetation fauna. This could conceivably be due to
the almost total lack of information of con-
voyed by a few random samples such as those
described here. Nevertheless it is felt that
there are sufficient grounds for believing that
there are distinctive features in the fauna of the
Orange which merit further investigation on
a larger scale. Some differences may prove
to be linked with the high turbidity and salt
loads of the Orange or the temperature
regime of the river.

THE DEVELOPMENT OF THE ORANGE
It is highly necessary to point out that the
proposed development scheme for the Orange
which will involve the construction of a
number of large dams will bring about pro-
found changes to considerable stretches of the
river. With this development will go increases

N.B. D = Present in small numbers
Table I: Percentage Composition of the Vegetation Found at Stations 1 to 4.

<table>
<thead>
<tr>
<th>Stations</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>N. senetrea</td>
<td></td>
<td>5.8</td>
<td></td>
<td>12.0</td>
</tr>
<tr>
<td>Oligochaeta</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Decapoda</td>
<td></td>
<td>8.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hyminchoidea</td>
<td></td>
<td>21.8</td>
<td>p</td>
<td></td>
</tr>
<tr>
<td>Pinemina</td>
<td></td>
<td></td>
<td>5.9</td>
<td></td>
</tr>
<tr>
<td>Brotia</td>
<td></td>
<td>1.9</td>
<td></td>
<td>1.8</td>
</tr>
<tr>
<td>Carcinus sp.</td>
<td></td>
<td></td>
<td>6.0</td>
<td>6.0</td>
</tr>
<tr>
<td>Pinnipus setosus</td>
<td></td>
<td></td>
<td>5.6</td>
<td>7.5</td>
</tr>
<tr>
<td>Brotia juveniles</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carcinus</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Odonata</td>
<td></td>
<td></td>
<td>p</td>
<td>7.5</td>
</tr>
<tr>
<td>Peduliomus maximus</td>
<td></td>
<td>4.7</td>
<td>16.0</td>
<td>12.0</td>
</tr>
<tr>
<td>Peduliomus varians</td>
<td></td>
<td>1.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Notothone</td>
<td></td>
<td>3.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nychia marshalli</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coleoptera</td>
<td></td>
<td>14.4</td>
<td>2.0</td>
<td></td>
</tr>
<tr>
<td>Spharacoidea</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Neotibida</td>
<td></td>
<td>2.6</td>
<td></td>
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</tr>
<tr>
<td>Neotibida</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Simuliidae</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Simuliurn lycum</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Simuliurn brevis</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Diptera</td>
<td></td>
<td>9.0</td>
<td>18.0</td>
<td>8.2</td>
</tr>
<tr>
<td>Anthomyiida</td>
<td></td>
<td>5.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Graphomyia subulata</td>
<td></td>
<td></td>
<td></td>
<td>4.0</td>
</tr>
<tr>
<td>total</td>
<td>94.5</td>
<td>98.0</td>
<td>71.8</td>
<td>67.1</td>
</tr>
</tbody>
</table>

N.B. p = present in small numbers.

in population and heavy demands for water, for domestic, agricultural and ultimately industrial use. Inevitably the problem of disposal of the different wastes peculiar to these uses will arise. It is therefore imperative that an early documentation of the biological and physico-chemical aspects of the Orange be undertaken to establish the relatively undisturbed ecological pattern at present prevailing. Not only will problems of pollution and self-purification arise but also the possibility of "foreign" organisms being introduced either accidentally or on purpose must be borne in mind. Here one automatically thinks of undesirable weeds ("Salviosa") or the marine vectors of human schistosomiasis, but undoubtedly beneficial species such as edible or sporting fish might also be introduced for aesthetic or recreational value or to be integrated into a fish production scheme.

The points briefly outlined above will, it is hoped, help delineate some of the scientific aspects which will need further study if the fullest benefit is to be gained from the Orange, both now and as development proceeds.

ACKNOWLEDGEMENTS

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